

No. 20944

In the
United States Court of Appeals
For the Ninth Circuit

HARRY P. LOCKLIN and ELMER J. BRANT,
general partners doing business under the
firm name of Radiant Color Company,

Plaintiffs-Appellants,

vs.

SWITZER BROTHERS, INC.,

Defendant-Appellee.

Appellants' Opening Brief

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SUBJECT INDEX

	Page
Jurisdiction	1
Statement of the case.....	2
Chronology of proceedings.....	2
Statement of factual background and issues.....	3
Questions presented	5
Specification of errors.....	5
Argument	8
The contempt order should be reversed because Radiant does not infringe the Kazenas claims.....	8
Preliminary discussion of evidence on the first question.....	8
The Gray test resin.....	9
The Wayne test resin.....	10
The Bennahmias test resin.....	11
Rule 52(a) does not control the issues on this appeal.....	12
The District Court erred in its choice of test resins.....	13
The purity of ingredients and mass of reaction should not have been disregarded.....	15
The time-temperature relationships are important.....	18
The Gray laboratory test resin should have been rejected.....	18
The Bennahmias laboratory tests confirmed non-infringement..	19
Summary	20
The District Court erred in defining aromatic hydrocarbon solvents	20
The District Court erred in lapse of time for evaluating insolu- bility	23
Summation as to specifications 1 through 14.....	32

	Page
The District Court erred in considering quantitative tests of solubility	33
The District Court also erred in its evaluation of the urea containing test resins.....	36
Summary on contempt issues.....	39
The contempt order should be reversed because the supporting evidence proves that the Kazenas patent violates 35 U.S.C. 112..	40
The prior appeal decision is interlocutory.....	45
The application of U. S. Code, Title 35, Section 112 was not fully covered in the first opinion.....	47
There has been a significant change in facts and circumstances warranting a review of the earlier decision.....	49
Switzer has now proved that there is no critical point which remains the same for each melamine compound.....	50
Switzer has now proved that the general description does not define the invention.....	62
Switzer has now proved that there is no simple clear test to determine substantial insolubility.....	66
Switzer has now proved that "aromatic solvents" are indefinite	71
The intervening case law confirms invalidity of the claims.....	75
Conclusion	79
Certificate of Counsel.....	80

TABLE OF AUTHORITIES

CASES	Pages
A R Inc. v. Electro-Voice, Incorporated (7 Cir. 1962), 311 F.2d 508	77, 78
Barkeij v. Lockheed Aircraft Corp. (9 Cir. 1954), 210 F.2d 1.....	58, 78
Cervantes v. United States (9 Cir. 1960), 278 F.2d 350.....	42
Chicago, Rock Island & P. R. Co. v. Hugh Breeding, Inc. (10 Cir. 1957), 247 F.2d 217.....	45
Citizens Nat. T. & S. Bank of Los Angeles v. United States (9 Cir. 1959), 270 F.2d 128.....	41
City of Seattle v. Puget Sound Power & Light Co. (9 Cir. 1926), 15 F.2d 794.....	42
City of Sedalia v. Shell Petroleum Corporation (8 Cir. 1936), 81 F.2d 193	45, 49
Clinton v. Joshua Hendy Corporation (9 Cir. 1960), 285 F.2d 199	41
Coleman Company v. Holly Manufacturing Company (9 Cir. 1959), 269 F.2d 660.....	41
Commercial Nat. Bank of Shreveport v. Connolly (5 Cir. 1949), 176 F.2d 1004.....	45
Connor v. New York Times Company (5 Cir. 1962), 310 F.2d 133	45, 47
Connett v. City of Jerseyville (7 Cir. 1940), 110 F.2d 1015.....	45
Corona Co. v. Dovan Corp. (1928), 276 U.S. 358, 48 S.Ct. 380....	23
Electrical Research Products v. Gross (9 Cir. 1941), 120 F.2d 301	41, 44, 50
Farmers' Cooperative Exchange v. Turnbow (9 Cir. 1940), 111 F.2d 728	78
Gen. Electric Co. v. Wabash Co. (1938), 304 U.S. 364, 58 S.Ct. 899	50, 60, 61, 78
Graver Mfg. Co. v. Linde Co. (1949), 336 U.S. 271, 69 S.Ct. 535	23, 29, 75
Graver Mfg. Co. v. Linde Co. (1950), 339 U.S. 605, 70 S.Ct. 854..	30
H. C. Baxter & Bro. v. Great Atlantic & Pacific Tea Company (1 Cir. 1965), 352 F.2d 87, affirming (D. Me. S.D. 1964), 236 F. Supp. 601.....	76, 78

	Pages
Hall Laboratories v. Economics Laboratory (8 Cir. 1948), 169 F.2d 65	60
Hanley v. Pacific Live Stock Co. (9 Cir. 1916), 234 Fed. 522.....	13
Hartford Life Ins. Co. v. Blincoe (1921), 255 U.S. 129, 41 S.Ct. 276	48, 49
Helms Bakeries v. C.I.R. (9 Cir. 1959), 263 F.2d 642.....	41, 43, 79
Higgins v. California Prune & Apricot Grower (2 Cir. 1924), 3 F.2d 896	45
In re Inland Gas Corp. (6 Cir. 1951), 187 F.2d 813.....	45
Johnson v. Cadillac Motor Car Co. (2 Cir. 1919), 261 Fed. 878....	45
Johnson & Johnson v. Kendall Company (7 Cir. 1964), 327 F.2d 391	76, 78
Knapp v. Morss (1893), 150 U.S. 221, 14 S.Ct. 81.....	36
Lawlor v. National Screen Service (1957), 352 U.S. 992, 77 S.Ct. 526	42, 43
Locklin v. Switzer Brothers, Inc. (9 Cir. 1961), 299 F.2d 160.....	2, 3, 8
Locklin v. Switzer Brothers, Inc. (9 Cir. 1965), 348 F.2d 244.....	4
Luminous Unit Co. v. Freeman-Sweet Co. (7 Cir. 1924), 3 F.2d 577	45
Marconi Wireless Co. v. U. S. (1943), 320 U.S. 1, 63 S.Ct. 1393....	46
Marshall v. Proctor & Gamble Manufacturing Company (D. Md. 1962), 210 F. Supp. 619.....	77, 78
Maryland Casualty Company v. Hallatt (5 Cir. 1964), 326 F.2d 275	45
McCulloch Motors Corporation v. Oregon Saw Chain Corp. (S.D. Cal. C. D. 1964), 234 F. Supp. 256.....	76, 78
Messenger v. Anderson (1912), 225 U.S. 436, 32 S.Ct. 739.....	43
Minerals Separation, Ltd. v. Hyde (1916), 242 U.S. 261, 37 S.Ct. 82	16
Nelson v. Batson (9 Cir. 1963), 322 F.2d 132.....	75, 78
Pacific American Fisheries v. Hoof (9 Cir. 1923), 291 Fed. 306....	42
Page v. St. Louis Southwestern Railway Co. (5 Cir. 1965), 349 F.2d 820	45

	Pages
Reynolds Spring Co. v. L. A. Young Industries (6 Cir. 1929), 36 F.2d 150.....	49
Reynolds Spring Co. v. L. A. Young Industries (6 Cir. 1939), 101 F.2d 257.....	49
Rogers v. Chicago, R.I. & P. Ry. Co. (8 Cir. 1930), 39 F.2d 601....	45
Schauffler v. Local 1291, Internat'l Longshoremen's Ass'n (3 Cir. 1961), 292 F.2d 182.....	13
Seagraves v. Wallace (5 Cir. 1934), 69 F.2d 163.....	45
Simmons Co. v. Grier Bros. Co. (1922), 258 U.S. 82, 42 S.Ct. 196..	46
Standard Brands v. Yeast Corp. (1939), 308 U.S. 34, 60 S.Ct. 27....	61, 78
Standard Oil Co. v. Tide Water Associated Oil Co. (3 Cir. 1946), 154 F.2d 579.....	61
Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co. (7 Cir. 1952), 196 F.2d 103.....	13, 20, 23, 29, 40
Union Light, H. & P. Co. v. Blackwell's Admr. (Ky. 1956), 291 S.W. 2d 539, 87 ALR 2d 264.....	42
United Carbon Co. v. Binney Co. (1942), 317 U.S. 228, 63 S.Ct. 165	59, 60, 61, 78
United States v. Fullard-Leo (9 Cir. 1946), 156 F.2d 756, aff'd (1947), 331 U.S. 256, 67 S.Ct. 1287.....	41, 43
United States v. General Motors Corp. (1966), U.S., 16 Led 2d 415, 86 S.Ct.	13
United States v. Parke, Davis & Co. (1960), 362 U.S. 29, 80 S.Ct. 503	13, 23
United States v. U. S. Smelting Co. (1950), 339 U.S. 186, 70 S.Ct. 537	43, 47
Vitamin Technologists v. Wisconsin Alumni Research F. (9 Cir. 1944, as amended 1945), 146 F.2d 941.....	58, 59, 78
Woodworkers Tool Works v. Byrne (9 Cir. 1953), 202 F.2d 530..	42

STATUTES

U. S. Code, Title 28, Section 1292(1).....	1
U. S. Code, Title 28, Section 1292(4).....	1
U. S. Code, Title 28, Section 1338(a).....	1
U. S. Code, Title 28, Section 2107.....	2
U. S. Code, Title 35, former Section 33.....	60
U. S. Code, Title 35, Section 112.....	5, 40, 41, 45, 47, 75, 78, 79

RULES	Pages
Federal Rules of Civil Procedure, Rule 52(a).....	12, 13, 20
Rules of the United States Court of Appeals for the Ninth Circuit, Rule 18	80
Rules of the United States Court of Appeals for the Ninth Circuit, Rule 19	80

MISCELLANEOUS

Annotation "Erroneous Decision as Law of the Case on Subsequent Appellate Review," 87 ALR 2d 271-360.....	42
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ABBREVIATIONS USED IN APPELLANTS' OPENING BRIEF

"Radiant" refers to Harry P. Locklin and Elmer J. Brant, general partners doing business under the firm name of Radiant Color Company, Plaintiffs-Appellants.

"Switzer" refers to Switzer Brothers, Inc., Defendant-Appellee.

The record references (CT....) refer to the pagination of the clerk's transcript filed on this Appeal No. 20,944.

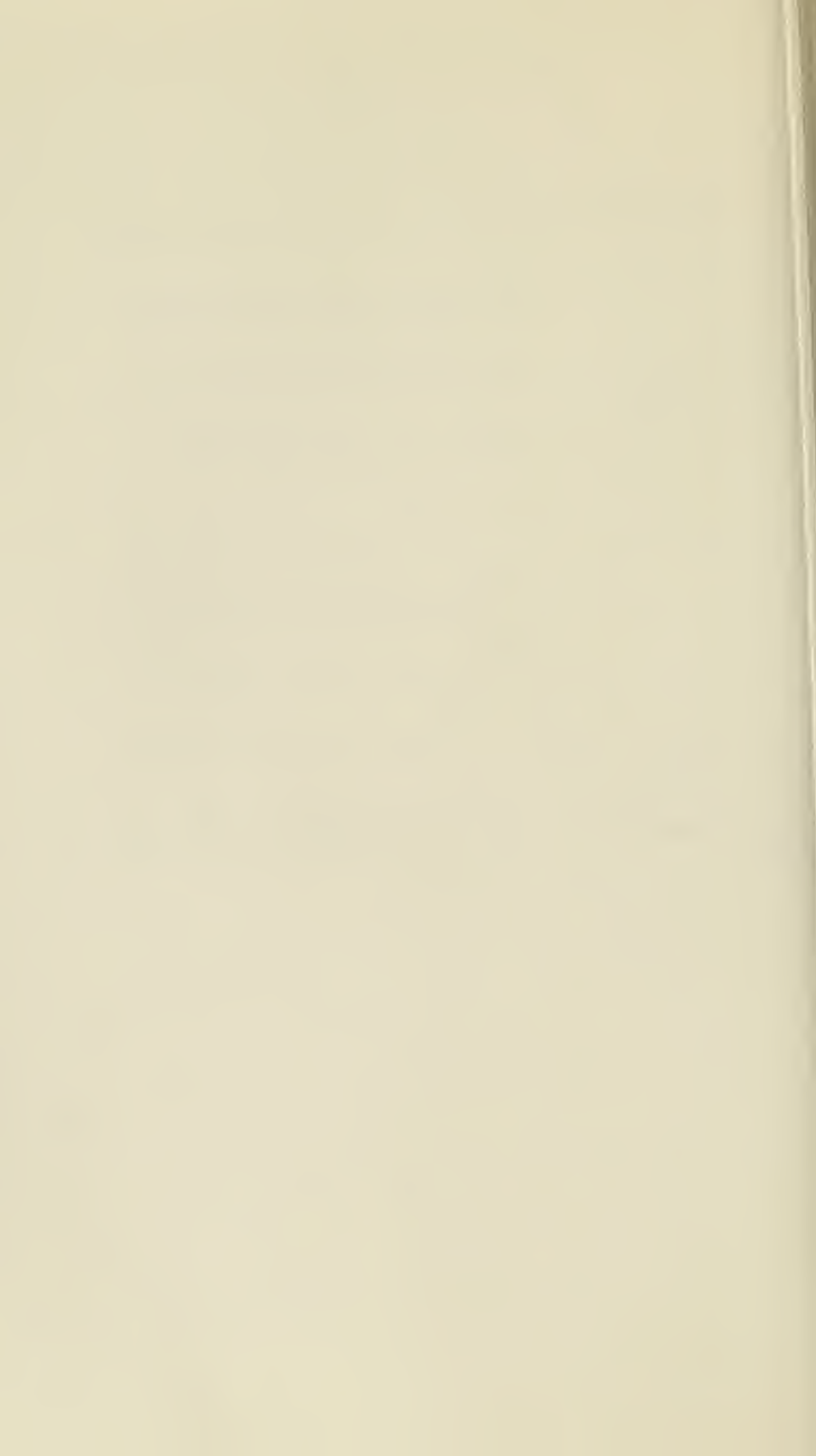
The record references (RT....) refer to pagination of the reporter's transcript on the contempt hearings.

The record references (OR....) refer to pagination of the printed record on the original Appeal No. 16,780.

The references to Exhibits S-.... and Dcx S-.... refer to exhibits identified by Switzer in the contempt hearing.

The references to Exhibits R-.... and Pcx R-.... refer to exhibits identified by Radiant in the contempt hearing.

The "7-4-1" resins refer to various test resins made by the parties with 7 moles of formaldehyde, 4 moles of toluene-sulfonamide, and 1 mole of melamine.



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HARRY P. LOCKLIN and ELMER J. BRANT,
general partners doing business under the
firm name of Radiant Color Company,

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SWITZER BROTHERS, INC.,

Defendant-Appellee.

Appellants' Opening Brief

This is an appeal from an order (a) holding Radiant in civil contempt for violating an injunction against infringement of the Kazenas patent owned by Switzer; (b) enjoining and restraining Radiant from manufacturing, using, selling or offering for sale "Radiant's 4-C series fluorescent resins and pigments and all other fluorescent pigments equivalent in relation to the patent in suit to the original fluorescent pigments previously adjudicated" to infringe and (c) requiring Radiant to account to Switzer for damages.

JURISDICTION

Jurisdiction of the District Court is based upon U. S. Code, Title 28, Section 1338(a), the underlying action having arisen under the patent laws of the United States.

Jurisdiction of this Court is based upon U. S. Code, Title 28, Section 1292(1) and 1292(4), this appeal being taken from an order which is both (a) an interlocutory order of the District Court granting or modifying an injunction and (b) a judgment in a civil action for patent infringement which is now final except

for accounting. The judgment was entered on March 30, 1966 (CT 121), and the notice of appeal was filed April 4, 1966 (CT 127), within the 30-day period provided by U. S. Code, Title 28, Section 2107.

STATEMENT OF THE CASE

Chronology of proceedings

The present proceedings are a sequel to an earlier trial in which the District Court held that Claims 1, 2, 3, 4 and 9 of the Kazenas patent were valid and that Radiant infringed said claims in its manufacture, use, sale and offer for sale of "Velva-Glo" fluorescent pigments (CT 30). This earlier judgment was affirmed in *Locklin v. Switzer Brothers, Inc.* (9 Cir. 1961), 299 F.2d 160. The Supreme Court denied certiorari as well as rehearing (369 U.S. 861, 891).

On May 2, 1962, the District Court issued a writ of perpetual injunction, pursuant to the mandate of this Court, permanently restraining and enjoining Radiant from directly or indirectly making, using, selling or offering for sale, except under license from Switzer, any fluorescent pigment embodying or manufactured by the use of the inventions disclosed and claimed in Claims 1, 2, 3, 4 and 9 of the Kazenas patent or in any other way infringing upon said claims. (CT 35).

On May 8, 1963, Switzer filed a petition for an order adjudicating Radiant in civil contempt for violation of the judgment and the injunction by its manufacture and sale of the now accused pigments identified generally as Radiant's 4-C series fluorescent pigments (CT 40). In a memorandum of decision filed March 31, 1964, the District Court concluded on the basis of affidavits that Radiant violated its writ of perpetual injunction. Upon appeal from the formal order (CT 103), this Court remanded the case to the District Court with directions that trial be had upon the sole question whether, in the 4-C resin, the amount of melamine utilized is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in the former opinion of this Court (CT 106 and 348 F.2d 244).

After remand, the District Court held an evidentiary hearing on the above question from October 11, 1965 to October 15,

1965. In a memorandum of decision, filed February 17, 1966, the District Court again concluded that Radiant violated its writ of perpetual injunction. The Court below held that the amount of melamine utilized in the 4-C pigment was within the limits of the claims of the Kazenas patent as those claims are delineated in *Locklin v. Switzer Brothers, Inc.* (9 Cir. 1961) 299 F.2d 160 (CT 119). This appeal from the formal judgment entered March 30, 1966 (CT 121) followed on April 4, 1966 (CT 127).

Statement of factual background and issues

The Kazenas patent relates to a thermoplastic melamine-sulfonamide-formaldehyde resin which is capable of being finely ground and "which remains insoluble without agglomeration in aromatic hydrocarbon solvents" (299 F.2d 162-163). Claim 2 is typical of the claims involved in this appeal (299 F.2d 163). Claim 2 provides, element by element:

"A completely condensed, thermoplastic resin consisting essentially of the condensation product of

at least one aldehyde component entirely selected from the class consisting of formaldehyde and paraformaldehyde,

at least one aromatic monosulfonamide having two reactive amide hydrogens, where the sulfonamide group is attached directly to the aromatic nucleus through the sulfur atom,

and at least one melamine compound selected from the class consisting of melamine, alkyl melamines having no more than one alkyl substituted amido nitrogen, and monohydric alkanol modified methylol and alkyl methylol melamines, the amount of said melamine compound being an amount, not exceeding 50% by weight of the aromatic monosulfonamide,

sufficient to render said condensation product substantially insoluble in aromatic hydrocarbon solvents

but insufficient to render it thermosetting."

The accused 4-C pigment, like the resins which were found to infringe the Kazenas patent in the first appeal, is thermoplastic and contains the aldehyde, sulfonamide and melamine components of the claims. Radiant contends that the amount of melamine

compound embodied in the manufacture of the accused pigment is not within the critical limits of the claims of the Kazenas patent as those claims are delineated in *Locklin v. Switzer Brothers, Inc.*, 348 F.2d 244, e.g. that the accused pigments do not contain an amount of melamine compound "sufficient to render the condensation product substantially insoluble in aromatic hydrocarbon solvents".

Radiant made essentially the same basic argument on the first contempt appeal. The question raised on that appeal was whether the Kazenas patent covered resins which were rendered substantially insoluble by melamine plus the additional ingredient urea, rather than melamine alone. Radiant successfully urged that the patent covered only the latter types of resins and not those which were rendered "substantially insoluble in aromatic hydrocarbon solvents" by melamine plus the additional ingredient. Switzer argued that the proper test was whether or not the amount of melamine utilized by Radiant was within the area covered by the examples of the Kazenas patent, and that it was merely a question of whether the 4-C resin is equivalent to the infringing resin to which the injunction was directed. This Court rejected Switzer's contentions and held (348 F.2d 246):

"... In our judgment if appellants' contentions are factually correct there would be no infringement. In our earlier opinion we ruled that the use of this functional language in specifying the amount of melamine required (an amount sufficient to render the condensation product substantially insoluble in aromatic hydrocarbon solvents, but insufficient to render it thermo-setting) did not invalidate the claims, but by the same token it served to fix precisely the limits of the claims."

This appeal probes the experiments and other circumstances upon which the District Court relied to conclude that the accused 4-C pigments do contain melamine in an amount sufficient to render the product substantially insoluble in aromatic hydrocarbon solvents. Radiant contends that the experiments and tests upon which the District Court relied in the contempt trial do not prove that these pigments contain sufficient melamine to bring the resin

within the limits of the claims as those claims are delineated in this Court's earlier opinion. Radiant also contends that certain of Switzer's tests as well as Radiant's own tests conclusively prove that the accused pigments do not utilize melamine in an amount sufficient to infringe the claims.

Questions presented

On this appeal, Radiant presents two questions:

1. Did Switzer prove that the accused pigments infringe the Kazenas patent by providing an amount of melamine sufficient to render the resin of the pigment substantially insoluble in aromatic hydrocarbon solvents as those claims were delineated in this Court's opinion on the first appeal?
2. Notwithstanding this Court's decision on the first appeal, in view of the new circumstances brought out on the contempt hearing and the intervening case law, do the claims of the Kazenas patent truly comply with U. S. Code, Title 35, Section 112?

Both of these questions, Radiant submits, should be answered in the negative.

SPECIFICATION OF ERRORS

Pursuant to Rule 18(d) of this Court, Radiant urges that the District Court erred:

1. When it failed to find that tests made with Radiant's inter-partes test resin produced on September 2, 1965 proved that the accused pigment is *not* one which will remain free flowing in either of the aromatic hydrocarbon solvents benzene or toluene;
2. When it failed to find that the tests of Radiant's inter-partes test resin produced on September 2, 1965 in a regular batch or production run using the same raw material and quantities as used in the manufacture of accused pigments is the most accurate test for determining the functional behavior of the three essential ingredients in the accused pigments;
3. When it failed to find that Radiant's inter-partes test resin produced on September 2, 1965 was made by taking the same three essential ingredients as those used in the typical ac-

cused pigment and reacting them in the absence of urea, the oxalic acid and the dyestuff, but otherwise in the same manner in which Radiant made the accused pigment commercially;

4. When it failed to find that Radiant's inter-partes test resin produced on September 2, 1965 was made by using comparable paratoluene sulfonamide, the same paraformaldehyde, and the same melamine as Radiant used in the manufacture of the accused pigment;

5. When it failed to find that the tests made with Radiant's inter-partes test resin produced on September 2, 1965 are confirmed by some earlier tests made by Switzer where the 7-4-1 resin agglomerated in benzene in one week;

6. When it failed to find that the probative value of tests made on Radiant's inter-partes test resin produced on September 2, 1965 is further confirmed by the contrary results obtained in testing a laboratory resin made by Switzer using a different kind of melamine ingredient (having a pH nine times more acidic than that used in the manufacture of accused pigments), and different time-temperature procedures;

7. When it gave weight to defendant's exhibits S-6 through S-8 and S-22 through S-27 as showing the insolubility characteristics of the accused pigment and the patented resin.

8. When it found that there was "no merit in Radiant's contention that the results (of Switzer's inter-partes tests) are not reliable because of certain differences between the kind of melamine Switzer used in its qualitative tests and that used by Radiant, and because of certain differences in the method of preparation of the test resin by Switzer" (CT 115);

9. When it found that "the benzene test conducted by Radiant, showing its JS-738 resin to have agglomerated in benzene after approximately seven weeks, does not disprove that the accused resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents" (CT 115 and 119);

10. When it failed to find that patented resins must be insoluble in all aromatic hydrocarbon solvents, rather than one or some hydrocarbon solvents;

11. When it failed to find that the patented resin must remain free flowing in aromatic hydrocarbon solvents without agglomeration for a substantial period of time and at least as long as four months;

12. When it found that "at the original trial, the lapse of time between the date when the resin was placed in toluene and the date when the observations of the condition of the resin in the toluene were made, was less than one week" (CT 112);

13. When it found that "when taken together, the 24 hour and 17 day qualitative test conducted by Switzer, and the qualitative tests conducted by Radiant which show that their JS-738 resin was free flowing and dispersed in toluene and xylene after approximately seven weeks, are simple clear reliable tests, which demonstrate that . . . the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents" (CT 115);

14. When it found that "the above tests when considered together . . . show beyond any doubt that the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents" (CT 115-116);

15. When it found that "the results of the quantitative tests (conducted by Switzer) with the JS-738 resin substantiate the findings . . . with regard to the qualitative tests, to wit: that the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents." (CT 117);

16. When it failed to find that Switzer's quantitative tests for determining substantial insolubility should be rejected because such 24-hour tests are not significant in determining the ultimate issue of whether the amount of melamine used in the manufacture of a resin is sufficient to render the resin substantially insoluble in aromatic hydrocarbon solvents;

17. When it failed to find that quantitative tests for determining the substantial insolubility of a resin in aromatic hydrocarbon solvents are indefinite and do not serve to distinguish over the prior art Japanese resin;

18. When it failed to find that none of the experts testifying

at trial could attach a numerical value to the term "substantially insoluble" for purposes of establishing a quantitative test;

19. When it failed to find that there is no known relationship between quantitative solubility and a determination of whether a resin is either "substantially insoluble" or will remain free flowing and not agglomerate;

20. When it failed to find that the only tests made in this record to show the time required for M-S-F resins to attain equilibrium in solution demonstrates that equilibrium is not reached in 24 hours;

21. When it found that the record indicates that "the additional urea, itself, has little or no effect in producing substantial insolubility" (CT 117);

22. When it found that "the agglomeration of the JS-739 resin (with urea) in benzene after approximately seven weeks demonstrates that the addition of urea had no apparent effect on the 4-C resin" (CT 119);

23. When it found that "the amount of melamine by itself in the accused 4-C resin is sufficient to render it substantially insoluble in aromatic hydrocarbon solvents" (CT 117);

24. When it found that "the amount of melamine utilized (in the 4-C resin) is such as to bring the resin within the limits of the claims of the Kazenas patent as those claims are delineated in *Locklin v. Switzer Bros., Inc.*, 299 F.2d 160 (9th Cir. 1961)" (CT 119);

25. When it failed to dismiss defendant's petition for Order Adjudicating Respondents, Harry P. Locklin and Elmer J. Brant, in Civil Contempt for Violation of Judgment and Injunction.

ARGUMENT

THE CONTEMPT ORDER SHOULD BE REVERSED BECAUSE RADIANT DOES NOT INFRINGE THE KAZENAS CLAIMS

Preliminary discussion of evidence on the first question

The accused pigment is generally referred to in this brief and in the record below as the "4-C" pigment. This pigment is exemplified by formula sheet 5782 dated February 24, 1963 (Pcx R-1, RT 331, 340-341).

This exemplar of the accused pigment called "CHART 4C R-104" was made with the following raw materials and amounts:

Paratoluene sulfonamide	381 lbs.	
Buffered melamine	70 lbs.	8 oz.
Paraformaldehyde	117 lbs.	8 oz.
Urea	16 lbs.	12 oz.
Dyestuff	12 lbs.	
Oxalic acid (411 grams)		14.4 oz.

The total mass of the raw materials was, thus, 598 pounds, 10.4 ounces. The raw materials were mixed in a large metal vat and heated in an oil bath for a total time of two hours, ten minutes (Pcx R-1, RT 346-349). After the dyed resin was finished, it was cooled and ground into pigment particles (RT 350-351).

In preparation for trial of the contempt issues, Radiant and Switzer made experimental test resins and conducted experiments to determine whether or not the accused 4-C pigment contained sufficient melamine compound to fulfill the functional limits of the claims. Each test resin used the three essential ingredients (melamine, sulfonamide and formaldehyde) of the patented resin but in the same 7-4-1 molar proportions as used in the manufacture of the accused pigment. Ingredients of the accused pigment other than the three essential ingredients were eliminated to isolate the "insolubility" effects produced by melamine apart from other ingredients, such as the urea, dye and oxalic acid of the accused pigment.

The Gray test resin

In order to prove that the accused pigment met the requirements of the claims, Thomas J. Gray, house counsel for Switzer and an experienced chemist, conducted an inter-partes experiment in which he produced a resin (Dcx S-5), which Switzer has called the 7-4-1 resin, using the following raw materials and proportions (RT 123; Dcx S-1, S-2, S-3, S-4 and S-9):

Ortho and paratoluene sulfonamide	342.4 grams
Paraformaldehyde	105.1 grams
Recrystallized melamine	63.05 grams

The total mass of ingredients was thus 510.55 grams or 1 pound, 1.9 oz. These materials were placed in a quart metal can, were stirred and were heated by means of an oil bath (RT 123-124). The material was then dumped, permitted to cool and was ground to obtain the ground resin of Exhibit S-5 (RT 124). This resin is usually referred to in this brief as the Gray test resin. Switzer used the Gray test resin in conducting certain of the solubility experiments upon which the District Court relied in its memorandum opinion.

The Gray test resin used the same molecular proportions of formaldehyde (7 moles), sulfonamide (4 moles), and melamine (1 mole) as those which were used in the accused pigment but it differed from the accused pigment in the following respects:

1. The Gray resin, quite properly, did not incorporate the urea, dyestuff, or oxalic acid of the accused pigments (Dcx S-9).
2. It substituted a recrystallized melamine for the buffered melamine used in the accused pigment (RT 130-131, 423-424, 596-597).
3. It substituted a mixed ortho- and paratoluene sulfonamide for the straight paratoluene sulfonamide used in the accused pigment (RT 129, 131-132, 591).
4. The ingredients were reacted in a different time-temperature relationship from that used to make the accused pigment (RT 424-425, 596-605).
5. The reaction mass of the Gray test resin (1 pound, 1.9 oz.) was but a minute fraction (0.19%) of the reaction mass of the accused pigment (598 pounds, 10.4 oz.).

We later argue that the Gray test resin has no probative value in assessing the behavior of the melamine, sulfonamide, and aldehyde components in the accused pigment.

The Wayne test resin

In order to prove that the accused pigment did not incorporate the melamine, sulfonamide and aldehyde components in the proportions called for in the claims, Radiant conducted an inter partes batch experiment in which it reacted the raw materials in the same vessel and following the same procedures as used in

producing the accused pigments (Pcx R-2; RT 332, 333, 346-349, 359-361). The raw materials and proportions used in the experiment were:

paratoluene sulfonamide	381 lbs.	
paraformaldehyde	117 lbs.	8 oz.
buffered melamine	70 lbs.	8 oz.

As in the case of the accused pigments, the reacted mass was permitted to cool and was ground into a powdered resin (RT 348, 350). This resin is hereinafter usually referred to as the Wayne test resin. Both Radiant and Switzer performed solubility experiments on this test resin (Pcx R-7; R-8; R-9 and R-10; Dcx S-33; S-34; and S-35; RT 202-205, 373-390). The District Court did not refer to these experiments nor to the Wayne resin itself in its opinion.

The Wayne resin was identical with the accused pigment with the single exception that it did not have the urea, dye stuff, or oxalic acid used in the accused pigment (RT 333; Pcx R-2). It compared with the accused pigment and the Gray resin in the following respects:

1. The accused pigment and the Wayne resin used substantially the same reaction mass—the Gray resin used a much smaller reaction mass.
2. The accused pigment and the Wayne resin were both made with buffered melamine (RT 363-364)—the Gray resin was made with recrystallized melamine (RT 130, 423-424).
3. The reaction in the Gray resin had a different time-temperature reaction than that used to make the accused pigment and the Wayne resin (RT 596-597).

We later argue that Radiant should have been able to rely on experiments conducted upon this Wayne test resin to determine whether or not the accused pigment comes within the scope of the Kazenas claims.

The Bennahmias test resin

Radiant also conducted an inter partes laboratory experiment using limited quantities of the essential raw materials to confirm (a) the results of its batch experiment and (b) the earlier results

of experiments which were made for the original contempt proceeding on a resin designated as JS-738. The raw materials and proportions used in the laboratory experiment were the same as those used to produce the Wayne test resin with the exception that the batches of formaldehyde and melamine were different. The ingredients, however, were the same as those used in some production runs (RT 411-412). This resin (Pcx R-16) is hereinafter usually referred to as the Bennahmias test resin and it was used in connection with solubility experiments (Pcx R-17, R-18 and R-19) referred to later in this brief.

The Bennahmias test resin has also been referred to in the record and in the District Court's Memorandum of Decision as a JS 738 resin. Therefore, the Court should be mindful that there are actually two JS 738 resins referred to in the record. The first JS 738 resin was made by Mr. Bennahmias in 1963, and that resin was used for conducting solubility tests that formed the basis of the earlier contempt appeal. The second JS 738 is Bennahmias test resin R-16, which was made during the inter partes test on September 3, 1965.

The discussion thus far in this argument is largely expository of the experiments which the parties conducted and Radiant believes that the matters thus far discussed are without substantial dispute. The issues presented by question 1 relate to the contentions which the parties made and which are based upon such experiments and their probative effect upon the issues presented for adjudication. With this general discussion of the evidence, we now turn to specific issues and show that—

Rule 52(a) does not control the issues on this appeal

In arguing reversible error upon the merits of the contempt judgment, we must first face the effect of Rule 52(a) of the Federal Rules of Civil Procedure on the issues under review. That rule provides that "Findings of fact shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses." It will appear that the issues presented on this contempt appeal do not depend so much upon credibility of wit-

nesses as they do upon the construction of the Kazenas patent claims and the earlier decision of this Court. We urge that "the issue for decision is legal rather than factual," as it was in *Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co.* (7 Cir. 1952), 196 F.2d 103 and that accordingly Rule 52(a) is not really germane to the present appeal.

As stated in *United States v. Parke, Davis & Co.*, (1960), 362 U. S. 29, 44:

"... Because of the nature of the District Court's error we are reviewing a question of law, namely, whether the District Court applied the proper standard to essentially undisputed facts...."

More recently, in *United States v. General Motors Corp.* (1966), U.S., 16 L. ed 2d 415, the Court in an opinion delivered by Mr. Justice Fortas, stated (16 L. ed 2d at page 424, footnote 16):

"In any event, we resort to the record not to contradict the trial court's findings of *fact*, as distinguished from its conclusory 'findings,' but to supplement the court's factual findings and to assist us in determining whether they support the court's ultimate legal conclusion that there was no conspiracy."

In considering the sufficiency of the evidence to support the contempt judgment, it is important that the burden of proof of establishing violation of the injunction is upon Switzer and that Radiant is entitled to the benefit of any reasonable doubt. This is established by cases such as *Hanley v. Pacific Live Stock Co.* (9 Cir. 1916), 234 Fed. 522 at page 531; and *Schauffler v. Local 1291, Internat'l Longshoremen's Ass'n* (3 Cir. 1961), 292 F.2d 182 at page 189.

The District Court erred in its choice of test resins

This portion of the argument is directed to specifications of error 1 through 8, both inclusive. In general, the error which Radiant asserts in each of these specifications turns upon the nature of the experiment which a member of the public is required to make to determine whether he is within or without the boundary line defined by the Kazenas claims.

Radiant's Wayne test resin R-7, upon which Radiant principally relies as showing the effects of melamine in the accused 4-C pigment, used the same raw materials and in the same quantities as used in the manufacture of the typical accused pigment (Pcx R-1, R-2). Importantly, Radiant used the same melamine as it used in the manufacture of accused pigments (RT 363-364), and the ingredients were reacted in exactly the same manner, following the same procedures and using the same equipment as in the commercial manufacture of the accused pigment (RT 332-335).

Radiant conducted solubility tests with the resin by placing portions of the test resin in jars with various aromatic hydrocarbon solvents, namely, benzene, toluene and xylene (RT 379-380; 385-389). At the time of trial, approximately six or seven weeks later, inspection of the jars containing the Wayne test resin R-7 in benzene showed complete agglomeration (RT 381-382; CT 113). Mr. Bennahmias testified that the Wayne test resin agglomerated in benzene after the second day (RT 445). Although the Wayne test resin was free flowing in toluene at the time of trial, there was some agglomeration (RT 386). Mr. Bennahmias predicted that the resin would be completely agglomerated in a year (RT 387-388). Radiant contends that these tests clearly demonstrate that Wayne test resin R-7, and consequently the accused 4-C pigment, do not contain the amount of melamine compound as required by the Kazenas patent.

Switzer's laboratory experiment Gray test resin was prepared by reacting the three essential ingredients of the patented Kazenas resin together, but in the molar proportions of Radiant's accused 4-C pigments (Dcx S-5 and S-9). However, the resin was not made in a batch quantity like Radiant's interpartes test resin R-7. Switzer's resin was prepared in a quart metal can using laboratory equipment (RT 123-124). Furthermore, Switzer's test resin was made using a different kind of melamine ingredient than that used in the manufacture of the accused pigment (RT 132); and that melamine ingredient (recrystallized melamine) had a pH nine times more acidic than the melamine compound used in the manufacture of the accused pigments (RT 595). Although Switzer's melamine ingredient corresponds with the definition of a

melamine compound as that term is used in the Kazenas patent, it is chemically different than Radiant's melamine and the two are different compounds (RT 596).

At the time Switzer made the Gray test resin S-5, it knew that the melamine it had selected for making the resin was different from that used by Radiant in the accused pigment (RT 132). When Switzer made its arbitrary selection of recrystallized melamine, it even had on hand the precise melamine compound Radiant used in the manufacture of accused pigment and test resins (RT 645).

The purity of ingredients and mass of reaction should not have been disregarded

On the first appeal, Switzer had firmly established that differences in purity of ingredients and mass of reaction were important elements which could not be disregarded in appraising the significance of chemical experiments. When it was important for Switzer to cast doubt upon the reliability of certain experiments conducted by Mr. Paulsen on the original trial, Switzer brought this out quite clearly in its examination of Dr. Hatcher (OR 405-406):

"Q. Now, Dr. Hatcher, how difficult is it for a chemist to repeat an amide condensation and obtain the same results time and again?

"A. Once the procedure has been standardized it can be done with ease.

"Q. Would the results be identical each time?

"A. Not entirely. They could vary in slight manner, but they would not be altered by any large amount.

"Q. Now, how difficult is it to repeat an amide condensation and obtain different results, particularly if you want to obtain different results? [162]

"A. That naturally would not be difficult at all.

"Q. What sort of hidden variables are there?

"A. There are many hidden variables. There are the rate of heating, the mass to reaction temperature, there is the rate of cooling, the length of time held at reaction temperature. Besides, the batch has a great effect in some cases. There is the ingredients used; the purity of the ingredients used can have considerable effect. The variables are numerous."

Here Dr. Hatcher quite specifically referred to the effect of the batch and the purity of ingredients. The Wayne test resin eliminated these variables—the Gray test resin capitalized upon them.

With regard to the hidden variables arising from the precise nature of the ingredients and the mass of reaction, Switzer's expert, Dr. von Fischer, frankly agreed that slight differences in the precise nature of the ingredients can cause a difference in result (RT 299) and frankly admitted that it was difficult to make comparisons between a plant production and a laboratory production (RT 646).

Dr. Huber also testified without dispute on this point (RT 629-630):

"Q. Now, you were asked whether in your opinion a determination of how the three ingredients had to be made, had to be made in the commercial sized batch. I will rephrase that question and ask you what gives a more accurate control to determine how resin ingredients work in a batch operation, is it if you compare it with the same mass and time in a batch operation or is it if you compare it with a minute quantity of ingredients in a laboratory operation?

"A. Obviously the former, namely, the same mass and time that is commercially used.

"Q. Now, in your experience as a chemist, have you noted whether production operations in the manufacture of resins are readily predictable only from a laboratory analysis?

"A. I would say unequivocally no. At least I have never come across such a situation."

Moreover, it is inherent in this Court's decision upholding definiteness and particularity of the claims that any testing would have to be done with the particular melamine compound which was under consideration and not with some other melamine compound. This follows from two portions of the Court's opinion.

The first portion is that this Court accepted Switzer's representations of "the fact that of the considerable number of melamine compounds encompassed by the patent, each has a different critical limit." and that "The critical point remains the same for each melamine compound used." (299 F.2d 165, 166). Certainly when a patent is sustained on the representation that there is a different critical point for each melamine compound, any probative experi-

ment should use the same melamine compound as that which is used in the accused pigment.

In this connection, *Minerals Separation, Ltd. v. Hyde* (1916) 242 U.S. 261, upon which this Court relied (299 F.2d 166), would not justify any expansion of the field of inquiry beyond the ingredients actually used in the accused product, The Court there pointed out, page 271, that "The composition of ores varies infinitely, each one presenting its special problem, . . ."

There, the patent specification clearly states (214 Fed. 101):

"The proportion of mineral which floats in the form of froth varies considerably with different ores, and different oily substances, and, before utilizing the facts above mentioned in the concentration of any particular ore, a simple preliminary test is necessary to determine which oily substance yields the proportion of froth or scum desired."

Similarly, the composition of melamine compounds varies infinitely, each one presenting its special problem. The tests should be related to the particular ingredients being accused in the infringing procedure, not to some other ingredients.

This factor was one which Switzer certified in its brief on Appeal No. 16,780. Switzer there said, page 51:

". . . At most, if a subsequent worker in the field wished to determine the minimum amount of some *particular melamine component* for imparting insolubility to the resin, it would require only a simple test. The same simple test can be used to determine whether a given resin, otherwise responding to the terms of the Kazenas patent, infringes. No experimentation is required." (emphasis added).

The second portion making it mandatory to use the specific melamine compound in testing for the critical limits of the claims is that Switzer persuaded the Court that all that was involved was "a simple, clear test for an ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case." What test could, we ask, be more simple and clear for an ordinary chemist to perform than a test with the precise ingredients which are accused to infringe? It is not sound, and it would conflict with the earlier opinion, to require that a chemist should conduct ex-

tensive experimentation with hypothetical raw materials to find out what the results would be if he were analyzing a hypothetical pigment rather than the actual pigment which was accused as an infringement. The use of different materials at best could give only a hypothetical answer to a hypothetical problem not facing the ordinary chemist when he was asked to perform the simple clear test required to sustain the Kazenas patent.

The time-temperature relationships are important

Aside from the mass of the reaction mixture and the particular melamine compound utilized, a comparison of the time temperature charts made during the manufacture of the Radiant Wayne resin and the Gray test resin clearly illustrates that a different type of reaction occurred during their manufacture (Pcx R-2; Dcx S-9, RT 590). The temperature of the oil used to heat the Wayne test resin was at all times above the temperature of the reaction mixture (RT 597), whereas the temperature of the oil used to make the Gray test resin was below the temperature of the reaction mixture for a substantial proportion of the production time, e.g., a period of 55 minutes out of a total production time of 85 minutes (RT 133). Dr. Hatcher, in his earlier testimony criticizing the experiments of Mr. Paulsen, pointed out that the rate of heating, the mass to reaction temperature, the rate of cooling and the length of time held at reaction temperature are hidden variables in an amide condensation (OR 406). Radiant's Wayne test resin eliminated these hidden variables—the Gray test resin applied them to reach the entirely different result which Dr. Hatcher must have had in mind in his earlier testimony.

The Gray laboratory test resin should have been rejected

The effect of variables in the lab experiments conducted by Mr. Gray is shown by his actual experiences with the ingredients which he selected. Mr. Gray actually made "maybe a dozen or a dozen and a half tests" in the preparation of his so-called 7-4-1 resin prior to the experiment in which he made the Gray test resin S-5 (RT 136). Some of these resins were tested for qualitative solubility in aromatic hydrocarbon solvents and agglomerated in benzene within one week (RT 137). To the direct contrary, the Gray

test resin had not even agglomerated at the time of trial, some seventeen days after the Gray test resin was deposited in benzene (RT 194). Such diversity of results cannot meet the standards laid down by this Court in response to Switzer's earlier representation that infringement could be ascertained by "a simple, clear test for an ordinary chemist to perform and one which does not require extensive experimentation . . ." (299 F.2d 166).

The Bennahmias laboratory tests confirmed non-infringement

The reliability of the Wayne test resin R-7 and the test showing it to have agglomerated in benzene at the time of trial is substantiated by the Bennahmias test resin R-16. That resin was made in Radiant's laboratory using the three essential ingredients of the Kazenas patent but in the same 7-4-1 molar proportions of the accused pigment (RT 410, 413). Moreover, the grades and kinds of ingredients were essentially the same as those used in manufacturing the accused pigments (RT 411-412). Solubility tests were then conducted by placing small amounts of the powdered resin in test tubes with the aromatic hydrocarbon solvents benzene, toluene and xylene (RT 415). At the time of trial, the test in benzene (Pcx R-17) was completely agglomerated (RT 417). With respect to the test in toluene (Pcx R-18), the resin had "partly agglomerated" but with "eight hard shakes" it became "free-flowing" (RT 418). Mr. Bennahmias testified that the resin R-16 would not remain free flowing in aromatic hydrocarbon solvents (RT 418-419), and that testimony was not contradicted.

Thus, at the time of trial, all solubility tests conducted with resins made during Radiant's inter partes tests on September 2 and 3, 1965, showed, consistently, that the melamine, sulfonamide and aldehyde components of the accused pigment would not produce a resin which would remain free flowing in aromatic hydrocarbon solvents. Both of Radiant's Wayne and Bennahmias inter partes test resins R-7 and R-16 had agglomerated in benzene and there was evidence that they would eventually agglomerate in toluene.

Mr. Bennahmias also testified and demonstrated that the inter partes Wayne and Bennahmias test resins made on September 2 and 3, 1965 behaved in essentially the same manner as another

7-4-1 test resin produced in Radiant's laboratory for use in the original contempt proceedings (Pcx R-43 and R-44; RT 405-410).

Summary

For the foregoing reasons, Radiant submits that the District Court committed error with respect to each of the matters set forth in specifications 1 through 8 both inclusive. The District Court should have permitted Radiant to rely upon experiments performed with the same raw materials, the same batch sizes, and the same time-temperature relationships as it used in producing the accused pigments. It was wholly erroneous, Radiant submits, for the District Court to expect the ordinary chemist to cast about and to perform hypothetical experiments having little or no real relationship with the accused product and process. Radiant submits that Rule 52(a) is not applicable to the subject matter of said errors. This, for the reasons stated in *Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co.*, (7 Cir. 1952), 196 F.2d 103, 107:

"... This is so for the reason that we think the issue for decision is legal rather than factual and, furthermore, we are not so much concerned with the findings made by Judge Dewey as we are with those which he failed to make and on one important issue (subsequently discussed) which he refused to make."

The District Court erred in defining aromatic hydrocarbon solvents

In this portion of the argument, Radiant urges that the Court committed error in writing the aromatic hydrocarbon solvent "benzene" out of the claims and looking only to the performance of the test resins in toluene and xylene (Specifications 9 and 10). These errors are directed to the following findings of the District Court:

"... According to the testimony of Dr. Von Fischer, and certain publications introduced at trial (RT 220-225), benzene has a very high solvent power, is the most volatile of the aromatic hydrocarbon solvents, is quite toxic and is not generally employed as a solvent in paint vehicles of the type herein used. Since benzene is the strongest of the three aromatic hydrocarbon solvents, a resin should agglomerate in it first." (CT 113-114).

* * * * *

"... the benzene test conducted by Radiant, showing its JS-738 resin to have agglomerated in benzene after approximately seven weeks, does not disprove that the accused resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents." (CT 115).

There is no apparent dispute but that resins made with only the three essential ingredients of the patented resin and in the 7-4-1 molar proportions of the accused pigments do *not* remain free flowing in benzene. As a matter of fact, Switzer's house counsel and expert, Mr. Gray, admitted under cross examination that some of the 7-4-1 resins Switzer had made and tested in benzene agglomerated within a week (RT 135-137).

Nevertheless, as shown above Switzer persuaded the District Court to reject benzene as a proper medium for testing a resin, since it is a very strong solvent and is not generally used in the manufacture of paints (CT 114). But there is nothing in the patent which distinguishes between one aromatic hydrocarbon solvent and another. The term "aromatic hydrocarbon solvents" as used in the patent specification and claims is a generic, all-inclusive expression; it is not limited to a single aromatic hydrocarbon solvent or to a limited few aromatic hydrocarbon solvents (Dcx S-14, Col. 6, ll. 4-8). Although Switzer's expert on the original trial, Dr. Hatcher, used only toluene in conducting his solubility experiments, he specially corrected himself to state that the patent taught resins which were insoluble in all aromatic hydrocarbon solvents, not just toluene (OR 392):

"Q. (By Mr. Manahan): How does Kazenas teach that no unreacting ingredients are present in its resin?

"A. By teaching that it's insoluble in toluene.

"The Court: I am sorry, I didn't hear your answer.

"The Witness: I say that it is insoluble in toluene.

"The Court: I still didn't get it.

"The Witness: Insoluble in toluene.

"The Court: Insoluble.

"The Witness: Or, rather, I should say in aromatic solvents."

Furthermore, the District Court's first memorandum of decision specifically refers to a prior art patent to Moss-White and

the teaching of a resin consisting "of two compounds both largely insoluble in benzene, which separate independently from a benzene solution" (OR 130-131). The Court distinguished the resin of that patent on several grounds including the fact that it "does not indicate that the described resin is a homogeneous resin, itself, substantially insoluble in aromatic hydrocarbons." (OR 131). Thus, Judge Goodman construed the test of "insolubility" in aromatic hydrocarbon solvents to include benzene.

Benzene is the simplest (parent) of all aromatic hydrocarbon solvents and it *is* used in the paint industry (Dcx S-38 and S-40; RT 289, 290). Dr. von Fischer on cross-examination conceded that benzene was sometimes used in paint vehicles. He conceded (RT 289), that "I am sure there is a small quantity used in specialty finishes." and that "Benzene is a member of the aromatic hydrocarbon series and, I have said, is used to a limited extent in paint formulations—specialty type formulations."

This Court's decision on the first appeal is stated in such general terms that it does not warrant a reconstruction of the phrase "aromatic hydrocarbon solvents" so as to eliminate benzene from its scope. To the contrary, this Court characterized the Kazenas resin as being one "which remains insoluble without agglomeration in aromatic hydrocarbon solvents" (299 F.2d 162-163). In comparison with the Japanese resin, this Court said the patent resin "'differs . . . in that it is soluble in aromatic hydrocarbons, while the Kazenas resin is substantially insoluble'" (299 F.2d 163). The earlier opinion of this Court referred to "aromatic solvents", "aromatic hydrocarbon solvents" and "aromatic hydrocarbons", always in the plural, and not to any one solvent in its delineation of the Kazenas patent (299 F.2d 162, 163, 164, 165, 166, 168).

The requirement of the patent that the insolubility of a resin be tested in "aromatic hydrocarbon solvents" demands that the test be met with all aromatic hydrocarbon solvents rather than with one or only some aromatic hydrocarbon solvents. It is a well-established rule of patent law, applied in chemical patent cases, that claims which cover a broad chemical group are permissible only if all members of the chemical group are effective to obtain

the claimed result. *Corona Co. v. Dovan Corp.* (1928), 276 U.S. 358, 385; and *Graver Mfg. Co. v. Linde Co.* (1949), 336 U.S. 271, 276-277. Since this Court has already held claims 1, 2, 3, 4 and 9 of the Kazenas patent valid, those claims must now be construed on the contempt hearings in a manner consistent with their validity.

Radiant submits, therefore, that specifications of error 9 and 10 should be sustained. These two errors, like those discussed in the prior section of this brief, relate to matters of law and do not depend upon the credibility of witnesses. Accordingly, a rejection of the Court's findings is warranted upon the authority of *Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co.* (7 Cir. 1952), 196 F.2d 103, 107, and *United States v. Parke, Davis & Co.* (1960), 362 U.S. 29, 44.

The District Court erred in lapse of time for evaluating insolubility

In evaluating the qualitative tests of insolubility, that is the capability of the test resin to remain suspended without agglomeration or coalescence in the hydrocarbon solvents, the District Court did not require that any of the experimental test resins should remain insoluble in aromatic hydrocarbon solvents but permitted Switzer to rely upon free flowing capabilities for limited, yet indeterminate, periods of time. In this connection, the District Court found specifically:

"... There is a dispute, however, over how long the resin must remain suspended without coalescence or agglomeration to come within the defining words of the patent claim: 'substantially insoluble in aromatic hydrocarbon solvents.'

"At the original trial in 1959 before Judge Goodman, the Court considered only tests in pure toluene in determining whether the resin was substantially insoluble in an aromatic hydrocarbon solvent. Furthermore, at the original trial, the lapse of time between the date when the resin was placed in toluene and the date when the observations of the condition of the resin in the toluene were made, was less than one week.

"Switzer demonstrated during this contempt hearing that its test resin remained free flowing and dispersed 24 hours after being placed in the pure solvents. Switzer also demon-

strated at the trial that the resin placed in the solvents on September 25, 1965, which had stood unshaken for 17 days, free-flowing upon being shaken at the trial." (CT 111-112).

* * * * *

"The JS-738 resin, which was placed in benzene on September 3, 1965 (Radiant's Exhibit No. 17) was introduced in evidence by Radiant and appeared to be agglomerated at the time of trial. But the JS-738 resin, which was placed in the toluene on September 3, 1965, (Radiant's Exhibit No. 18) was free-flowing—notwithstanding Mr. Bennahmias' statement that he thought it was partly agglomerated (RT 418). Further, the JS-738 resin, which was placed in xylene on September 3, 1965, (Radiant's Exhibit No. 19) was also free-flowing at the time of trial.

"Radiant relies greatly upon the test which showed that on the date of trial, the JS-738 resin, which had been placed in benzene on September 3, 1965, appeared to be agglomerated.

"However, all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent. The stronger the solvent the less time it will take to agglomerate. . . ." (CT 113).

Upon the basis of the foregoing and other determinations, the Court concluded:

"It is, therefore, the finding of the Court that, when taken together, the 24 hour and 17 day qualitative tests conducted by Switzer, and the qualitative tests conducted by Radiant which showed that their JS-738 resin was free flowing and dispersed in toluene and xylene after approximately seven weeks, are simple clear reliable tests, which demonstrate that, in fact, the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents." (CT 115).

Specifications 11, 12, 13 and 14 assert error in regard to these determinations. Certainly unless an accused resin remains free flowing in aromatic hydrocarbon solvents without agglomeration for a substantial period of time and for at least as long as four months, it does not meet the standard which Switzer itself established at the original trial to sustain validity and the standard upon which this Court held the Kazenas patent valid in the first

instance. The same standard of solubility should have been used on the contempt hearings as that which was used in establishing validity in the first instance.

In the first trial and on the first appeal, Radiant attacked the validity of the Kazenas patent contending, among other things, that the language of the claim was indefinite, particularly since there is no lower critical limit in the amount of melamine compound required to make a resin that was "substantially insoluble in aromatic hydrocarbon solvents".

Radiant's expert on the original trial, Mr. Paulsen, testified, based on solubility tests of one week, to the effect that there was no critical lower limit in the amount of melamine required to produce the functional results specified in the claim. Mr. Paulsen's tests showed that both the patented resin and the resin of the prior art Japanese patent would agglomerate in aromatic hydrocarbon solvents, an increase in the amount of melamine producing only a gradual change in solubility (OR 284-285; 288-289). Moreover, Mr. Paulsen testified that observations made one day after mixing a crushed resin in the solvent would not necessarily be the same after six days, depending on the resin tested (OR 357).

But the testimony of Switzer's expert, Dr. Hatcher, showed that the patented resin was one which "remained free-flowing" and "did not agglomerate" in aromatic hydrocarbon solvents (OR 397, 400-401, 407 and 412). Dr. Hatcher's testimony was based on a test conducted by placing an example of the patented resin in an aromatic hydrocarbon solvent and allowing it to stand for more than four months. Dr. Hatcher testified as to the solubility of that resin as follows:

"Q. How difficult is the solubility test for a resin?

"A. It is not difficult. It is readily observable." (OR 397)

* * * * *

"Q. What was the solubility of this resin in toluene?

"A. It was insoluble in toluene.

"Q. How can you tell?

"A. By dispersing it in toluene and leaving it. It did not agglomerate. It remained free-flowing.

"Q. When was this resin prepared?

"A. It was prepared in late August, 1958.

"Q. Have you had that sample under your watch and care ever since?

"A. I have had it in my possession since that time.

"Q. Is the resin still insoluble?

"A. The resin still is insoluble. It is free-flowing." (OR 400-401)

Under cross-examination, Dr. Hatcher also testified:

"Q. In the Japanese resin, I think that we are in agreement that that is not substantially insoluble in aromatic hydrocarbon solvent?

"A. That is correct.

"Q. And it is your position that Example 5 of the Kazenas resin is essentially insoluble in hydrocarbon solvents?

"A. Yes, it is.

"Q. At what point between 5% of the Japanese Patent and 13% of the Kazenas Example 5 does one note a change from insolubility—I mean from solubility to insolubility?

"A. I do not have that information. I know that at 5% it is soluble, at 13% it is insoluble.

"Q. Have you made any tests to determine what would happen if you would increase the percentage of melamine in the Japanese example by gradual increment to the percentage of melamine in Example 5 of Kazenas?

"A. No, I have not.

"Q. As a man skilled in the art, if we were to increase the percentage in the Japanese example from 5% to 7%, would there be a decrease in solubility in aromatic hydrocarbon solvents?

"A. I cannot say definitely; I can only speculate. At some point there would come the point at which the raw material would be free-flow. I do not know at what point that would be between 5 and 13%." (OR 412)

Judge Goodman relied on the testimony of Dr. Hatcher and expressly rejected the testimony of plaintiff's expert as "not convincing":

"Plaintiffs' expert testimony to the effect that the upper and lower limits specified in the patent are not in fact critical was not convincing . . . The experiments performed by Plaintiffs' expert to test the properties of resin samples pre-

pared in accordance with the examples in the Kazenas patent, in the opinion of the Court, are not reliable evidence to support Plaintiffs' contention that as one approaches the lower limit of the critical range within which the melamine content may be varied the proportion of melamine is inadequate to produce the aromatic hydrocarbon insolubility claimed by the patent. . . ." (OR 135)

Not only did Judge Goodman refuse to accept the testimony of Radiant's expert, but he sustained the opposition of Switzer and refused to consider post-decision tests which demonstrated the absence of a lower critical limit in the amount of melamine required to produce resins that would "remain" free flowing without agglomeration in aromatic hydrocarbon solvents. Following the first trial, but prior to appeal, Radiant brought a motion for a new trial based on newly discovered evidence (OR 211). In particular, Radiant offered testimony relating to post-decision tests and invited the Court to take a second look at physical evidence which had been offered at trial to demonstrate the free flowing and insoluble character of the Kazenas resin, asserting that such second look would demonstrate that since trial the resins had agglomerated. Switzer opposed this offer of proof and argued that there was no evidence as to the conditions to which this exhibit had been subjected following trial. The District Court sustained Switzer's opposition and refused to consider Radiant's new evidence (OR 251).

On appeal, Switzer's argument to this Court emphasized the importance of Dr. Hatcher's tests and the fact that those tests had been carried out some four months prior to trial:

" . . . In further support of his pre-trial affidavit (R. 48), Dr. Hatcher explained to the Trial Court that when he dispersed the Kazenas Example 5 resin in toluene: 'It did not agglomerate. It remained free-flowing' (R. 400).

"This initial toluene insolubility test for the Kazenas resin of Dx. N had been carried out some four months before the trial (R. 401), yet Dr. Hatcher was able to demonstrate these test results to the Court at the time of trial since the resin was still free-flowing in Dx. N (R. 401). . . ." (Appellee's Brief on first Appeal, p. 9-10)

In view of all of the foregoing circumstances, this Court upon the first appeal concluded that there was real novelty and invention in providing for a thermoplastic melamine sulfonamide aldehyde resin which would remain insoluble in aromatic hydrocarbon solvents without agglomeration. This Court used the word "remains" too pointedly to permit any misunderstanding but that this Court did indeed attach significance to that characteristic of the patented resin (299 F.2d 162-163):

"The Kazenas patent is for a resin which is a co-condensation of all three of these chemical components and which is thermoplastic but still is capable of being finely ground and which remains insoluble without agglomeration in aromatic hydrocarbon solvents."

By its footnote, this Court keyed the foregoing quotation directly to the language of the claims. This defines what this Court meant when it construed the words "substantially insoluble in aromatic hydrocarbon solvents".

There is nothing in the decision of the Court, nor is there anything in the patent specification, which warrants any deviation from the usual meaning of the word "remains".

The word "remains" is defined in Webster's Unabridged Dictionary as: "to continue unchanged in form, condition, status, or quantity." Radiant submits that this definition, which is not limited by time, is in accord with both the testimony of Switzer's first expert, Dr. Hatcher, and the earlier decision of this Court. Even Switzer's new expert, Dr. von Fischer, testified in the contempt trial that a resin which "must remain suspended without agglomeration or coalescence" in order to be "substantially insoluble" would have to stand in a suspended condition for "an infinite period of time" or "forever" (RT 256).

The District Court found, contrary to the fact shown in the original record, that "at the original trial, the lapse of time between the date when the resin was placed in toluene and the date when the observations of the condition of the resin in the toluene were made, was less than one week." (CT 112). This finding, as pointed out in specification of error 12, is clearly erroneous. There is no evidence to support it. To the direct contrary Judge

Goodman expressly rejected as being "not reliable" the only solubility tests based on a one week observation (OR 135).

In view of the recent findings of the District Court that "all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent" (CT 113), it is now apparent that the District Court, and Switzer as well, have disowned Dr. Hatcher's tests and testimony as showing a critical lower limit in the amount of melamine necessary to produce a resin which remains free flowing without agglomeration in aromatic hydrocarbon solvents. Nevertheless, on this contempt charge, Switzer and Radiant alike are now bound by this Court's earlier decision. Radiant contends that the matter of infringement (as far as the contempt proceeding is concerned) is to be governed by the "critical limits" by which Switzer induced this Court to hold the claims valid. It is wholly unreasonable for Switzer to have the claims sustained based on insolubility tests lasting more than four months (and testimony that patented resins "remained free-flowing") and then to assert an infringement based on tests lasting one day and, at the most, seven weeks. Yet this is precisely what Switzer has done.

This Court held that the functional language in the claims did not invalidate the claims but by the same token it served to fix precisely the limits of the claims (348 F.2d 246). This Court further expressly rejected Switzer's contention in the first contempt appeal that, irrespective of the qualitative effect produced by the melamine ingredient, its patent covered M-S-F resins that were equivalent for the same use as patented resins (348 F.2d 246). Radiant respectfully submits that Switzer is now estopped by its earlier representations to this Court from asserting that resins which do not remain free flowing are nevertheless covered by the patent.

The facts of this case are very much the same as those in *Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co.* (7 Cir. 1952), 196 F.2d 103, cert. den. (1952), 343 U.S. 967, reh. den. (1952), 344 U.S. 849. In that case the Court considered a contempt order entered upon certain chemical welding flux claims which had been held valid and infringed in *Graver Mfg. Co. v.*

Linde Co. (1949), 336 U.S. 271, and *Graver Mfg. Co. v. Linde Co.* (1950), 339 U.S. 605. The claims based their novelty on the feature that one or more alkaline earth metal silicates were present in "a major proportion." The Court of Appeals reversed a contempt order based upon a flux which contained silicates in amounts less than 50%. Specifically, the Court held that an enlarged interpretation of the proportions feature would leave the validity of the claims "open to serious challenge because of their indefiniteness and uncertainty." (196 F.2d 109). Moreover, the Court held that the patentee was bound by its earlier arguments made to secure the favorable adjudication in the first instance (196 F.2d 111-112). At page 112, the Court concluded:

"In our opinion, the application of the doctrine of equivalency in this case is to ignore the teachings of the patent, the representation upon which the claims in suit were allowed and, more pointedly perhaps, the representations by which their validity has been sustained in the courts. While the difference between plaintiff's composition and those accused may not be great, it is that difference which distinguished plaintiff's composition from the prior art and which enabled it to sustain the validity of its grant. It is now estopped from claiming otherwise.

"The judgment appealed from is reversed and remanded, with directions that it be vacated."

In the case at bar, this Court sustained the claims of the Kazenas patent on the interpretation that the melamine amount is critical and may be readily determined by "a simple, clear test". Such a test is essential to sustain the claims, and to now ignore that test is to leave their validity again open to serious challenge. Switzer used the testimony of its expert, Dr. Hatcher, to show that the patented resin "remained free-flowing" for some four months before the trial (OR 400-401). Switzer also argued that "the term 'substantially insoluble' defines a transition point that is critical with respect to the pigment use. And it is critical with respect to the distinction between the Kazenas invention and the Japanese patent" (Appellee's Brief on First Appeal, pp. 31-32). It is now too late for Switzer to enlarge the scope of its patent when it is shown that the melamine of the

accused pigment, like the melamine of the prior art Japanese resin, is insufficient to prevent agglomeration in aromatic hydrocarbon solvents. While the difference between resins of the Kazenas patent (which remain free flowing for at least four months) and the patented raw materials, and their proportions, used in the accused pigments (which remain free flowing for less than one week) is only a matter of degree, it was by virtue of such a difference that Switzer sustained the validity of the Kazenas patent. Switzer is now estopped from claiming otherwise.

Finally on this issue, the District Court relied upon certain experiments showing that the resins of the specific examples of the Kazenas patent were free flowing and dispersible in acrylic and alkyd paint vehicles for more than 5 years (CT 114; Dcx S-22 through S-27; RT 102-113). These experiments tend to prove nothing within the issues of this case. In the first place, the examples of the Kazenas patent are not the same as either the accused pigment or the melamine-sulfonamide-aldehyde raw materials and proportions used in the accused pigment. Consequently, the examples are not probative of the behavior of the three resin components of the accused pigment. In the second place, the issue before the Court was concerned with substantial insolubility in aromatic hydrocarbon solvents, not substantial insolubility in acrylic and alkyd paint vehicles. In the third place, these tests indicate the capability of the patented resins to remain free flowing and dispersible for a period of more than 5 years. This is permanent as compared with the very limited free flowing life of the three essential ingredients of the accused pigment in aromatic hydrocarbon solvents. The mere fact that Switzer found it necessary to rely upon such peripheral experiments should, we submit, cast real doubt upon the entire contempt issue.

In summary, Radiant contends that the word "remains" as used in this Court's earlier decision requires that a patented resin be one that is free flowing in aromatic hydrocarbon solvents for no shorter a period of time than that which this Court found necessary to sustain the validity of the claims. Since both the District Court and this Court relied upon the testimony and tests of

Switzer's former expert, Dr. Hatcher, to hold the Kazenas patent valid, the same test period, namely, at least four months, must be used to evaluate Switzer's charge of infringement. Inasmuch as the evidence obtained from Switzer's own expert shows that the 7-4-1 resin portions of the accused 4-C pigments do *not* contain sufficient melamine to prevent agglomeration in benzene when allowed to stand for even one week (RT 135-137), a fortiori, there can be no infringement. The fact that the District Court now finds that "all resins of this type will eventually agglomerate in any pure aromatic hydrocarbon solvent" is immaterial as far as the issue of infringement is concerned. Such a finding merely exposes the cynicism of Switzer in debating Radiant's earlier contention that there is no lower critical limit with respect to the amount of melamine compound required to produce a free flowing resin.

Summation as to specifications 1 through 14

With this argument based upon errors 1 through 14 both inclusive, we pause to urge that they show and illustrate the rationale upon which the Court decided the entire contempt matter. This appears from the Court's discussion which follows the subject matter which we have now covered in this argument:

"The Court, however, in no wise suggests that the above tests represent the minimum standard for determining the question presented or that the 24 hour qualitative test, alone, would not suffice for determining the question here. The Court merely holds that the above tests when considered together do in fact show beyond any doubt that the accused 4-C resin contains sufficient melamine to render it substantially insoluble in aromatic hydrocarbon solvents." (CT 115-116).

Specification 14 urges error in the general conclusion thus quoted. That error depends upon error 1 through 13 and, we submit, it should be sustained for the reasons already argued.

Nonetheless, despite the fact that the Court had concluded on the basis of the tests already discussed that Radiant infringed the Kazenas claims, the Court in what is more or less in the nature of an epilogue discusses subsidiary experiments in support of the conclusion thus reached (CT 116-119). We now argue that—

The District Court erred in considering quantitative tests of solubility

The first series of subsidiary experiments upon which the District Court relied to substantiate the earlier findings of infringement are based upon certain 24 hour quantitative solubility experiments which Switzer made upon a number of the test resins which indicated that minute amounts of the test resins went into solution in a 24 hour period when the results were measured quantitatively (CT 116-117). Radiant submits that it was improper for the District Court to give credence to any quantitative tests of solubility and directs specifications 15, 16, 17, 18, 19 and 20 to this portion of the opinion of the District Court.

The Kazenas patent does not define the term "substantially insoluble" in quantitative values (Dcx S-14; RT 14); and neither Radiant's expert nor Switzer's experts could attach a numerical value to the term "substantially insoluble" for purposes of establishing a quantitative test (RT 157-159; 248; 611-612; 629). Query, then, how is one skilled in the art to know if a resin is substantially insoluble?

Switzer's expert, Mr. Gray, testified that a resin which would go into solution only in an amount of .022 grams per hundred milliliters would be substantially insoluble (RT 160-161). But he admitted that he knew of no teaching which tells you when you reach the point where you have something that is soluble and when you get away from the point where you have something substantially insoluble (RT 157); nor was he able to say where that point would be (RT 157). When asked how you would determine "on a quantitative basis when one reaches the point where the resin is no longer substantially insoluble" but "becomes soluble", Mr. Gray answered simply: "The question of solubility is a relative matter and you would have to look to the uses to which you intend to put it, and you would have to conduct experimentation within that area" (RT 158). Even so, Mr. Gray admitted that he had done no work upon which he could base an opinion as to a quantitative number which might be indicative of "quantitative insolubility" (RT 158-159). Mr. Gray's opinion that .022 grams per hundred milliliters is substantially insoluble was simply based on "the size of the figure" (RT 160).

Switzer's other expert, Dr. von Fischer, was no more definite than Mr. Gray in establishing a quantitative value for the term "substantially insoluble". Dr. von Fischer could only suggest that the dictionary definition of insoluble should be applied, namely, "Not dissolving in a solvent (except in minute amounts)." (RT 229; Dcx S-42). Dr. von Fischer admitted that the term "insoluble" is a relative one and not a quantitative expression—"it would allow for a wide variance in the amounts of materials that would dissolve" (RT 230). In the resin field, according to Dr. von Fischer, a minute amount would "depend on the conditions under which the resin is used. It is a practical consideration. . . . The practical consideration would be to use the resin in the application or type of application to which it would be used, or its industrial purpose, to see whether or not it would work satisfactorily, and this could not be related with a number figure." (RT 248). If he were to set a numerical limit on something which will remain insoluble in aromatic hydrocarbon solvents, he would proceed "only by trying the resins practically in a formulation to see whether or not they remain stable . . . in a finished paint or ink". (RT 269-270).

The uncontroverted evidence shows that the prior art Japanese patent has a solubility of only 0.18 grams per hundred milliliters of toluene when tested on a 24-hour basis (Pcx R-48; Dcx S-15; RT 531-532). In his opening statement to the District Court, Switzer's counsel represented that a solubility of "only 0.15 grams" of resin is substantially insoluble (RT 13, 16), and that a solubility "on the order . . . of one tenth of a gram for a hundred milliliters of solvent" is to be considered substantial insolubility (RT 39). Such a test cannot soundly be brought forth at this late day because the Japanese resin is clearly substantially insoluble by the very same quantitative test which Switzer urges as a basis for finding infringement. If the Japanese resin is different than the resins of the Kazenas patent, as this Court has already found, then the quantitative test has no significance in defining the term "substantially insoluble".

There is another reason why 24-hour quantitative tests should not determine the ultimate issue of infringement. Those tests

were premised upon Dr. von Fischer's belief that M-S-F resins attain equilibrium in solutions in less than 24 hours (RT 234-237). He assumed that the saturation point (equilibrium) would be reached in a very short period of time "but certainly, again, within a maximum of a 24-hour period" (RT 236).

The record makes clear that Dr. von Fischer was dead wrong in this assumption. The only tests conducted by the parties and made of record in the contempt proceedings demonstrate that equilibrium is *not* reached in 24 hours (RT 536-556; Pcx R-49 through R-56). Using the same procedure as that used by Dr. von Fischer for taking Switzer's solubility readings, Radiant's expert, Dr. Weiner, found that the Wayne test resin did not reach equilibrium in the aromatic hydrocarbon solvent benzene for more than 33 days (Pcx R-56). When the Wayne resin was tested by stirring the resin in benzene (a method not used by Switzer but which hastens equilibrium), equilibrium did not occur in 46 hours (Pcx R-54). There is no evidence in this case contradicting these facts.

Dr. von Fischer did not conduct any test to determine whether equilibrium was actually reached in a period of 24 hours (RT 246). The only quantitative tests conducted by Dr. von Fischer were for a maximum of 24 hours and at no time did he make a determination as to whether equilibrium *is* reached in 24 hours (RT 247).

Radiant submits therefore that the evidence as a whole shows that Switzer's "24 hour quantitative test" cannot be relied upon either to determine which resins will remain insoluble or to define the meaning of "substantially insoluble in aromatic hydrocarbon solvents" by reference to some numerical figure. They are not pertinent to this Court's earlier decision that the Kazenas resin "remains insoluble without agglomeration in aromatic hydrocarbon solvents" (299 F.2d 162-163). Specifications 15 through 20 should be sustained.

The fundamental difficulty with the 24 hour quantitative tests is that experiments in that area do not serve to distinguish the critical limit between the Japanese prior art resin and the patented resin. When the Japanese patent has a solubility of only 0.18

grams per 100 millileters toluene when tested on a 24 hour basis, the Japanese patent undebatedly meets the definition of the Kazenas claims that the amount of melamine is an amount sufficient to render the resin substantially insoluble in aromatic hydrocarbon solvents. Remembering that the words "substantially insoluble" are relative terms and remembering that the pure sulfonamide aldehyde resin (Santolite MHP) has a solubility of more than 300 grams per 100 milliliters of toluene (RT 557) the quantitative tests can be justified only to make out a case of patent invalidity. The reason for this is that anything which would infringe a patent if later, anticipates it if earlier. *Knapp v. Morss* (1893), 150 U.S.221, 228. On the merits of the contempt issue, Radiant has accepted the proposition that it cannot attack the validity of the underlying claims. By the same token, Switzer should not be permitted to read into the claims any experiments which would render them invalid. Radiant submits that the District Court committed clear error in relying upon any of the quantitative tests in the specifics set forth in specifications 15 through 20, both inclusive.

The District Court also erred in its evaluation of the urea containing test resins

The District Court recognized that the question whether the urea of the accused pigments produces or tends to produce substantial insolubility in aromatic hydrocarbon solvents is *not* the determinative issue (CT 117). Nevertheless, the Court held "that the additional urea, itself, has little or no effect in producing such substantial insolubility" (CT 117). The evidence referred to in the Court's opinion was then used "to confirm the Court's finding that it is the melamine, alone, which renders the accused 4-C resin substantially insoluble in the aromatic hydrocarbon solvents" (CT 118). Radiant contends that the latter two findings are erroneous, particularly since the only meaningful evidence in the case shows conclusively that the urea used in the manufacture of the accused pigments contributes substantially to the insolubility of the resin (Specifications 21 and 22).

The Court based the contested findings on certain inter partes test resins (JS-738 and JS-739) and tests made in Radiant's laboratory on September 3, 1965 (CT 118-119). The JS-738 designation represents a 7-4-1 resin, also identified as resin R-16, which was made with the three essential ingredients only of the Kazenas patent; the designation JS-739, also identified as resin S-37, represents a 7-4-1 resin made with the three essential ingredients plus a half mole of urea (RT 210). At the time of trial, Radiant showed that the JS-738 resin had agglomerated in benzene after seven weeks (Pcx R-17; RT 417). Inasmuch as this evidence conclusively showed that 7-4-1 resins would not remain free flowing in aromatic hydrocarbon solvents (and the Court so found) it thus became completely unnecessary and irrelevant for Radiant to show the effect of urea in making the accused pigments. Therefore, Radiant did not introduce in evidence any of the tests made with the JS-739 resin.

The single piece of evidence that the Court relied upon for its finding "that the addition of urea had no apparent effect on the 4-C resin" was that, at the time of trial, Switzer introduced tests of the JS-739 resin (with urea) showing that the resin had agglomerated in benzene (Dcx S-46). Although this evidence shows that the 7-4-1 resin with urea, as well as 7-4-1 resins without urea, agglomerate in benzene within seven weeks, it does *not* demonstrate that the urea had no effect on the solubility of 7-4-1 resins.

Parenthetically, it is anomalous that the Court should reject tests of agglomeration in benzene to show the "substantial insolubility" of the patented resin but yet use benzene tests as a basis for evaluating the comparative solubilities of the JS-738 and 739 resins.

In connection with the earlier contempt proceedings Radiant made tests with resins JS-738 and JS-739. On July 13, 1963, Radiant placed samples of both types of resins in benzene and toluene. At the time of the contempt trial, both resins had agglomerated in benzene (Dcx R-43 and R-46; RT 406, 513), but only the JS-738 resin (made without urea) had agglomerated in toluene (Dcx R-44; RT 516); the JS-739 resin in toluene remained free

flowing (Dcx R-47; RT 516). This evidence clearly shows that the urea qualitatively improved the free flowing character of 7-4-1 resins.

Switzer's own testing of the JS-738 and JS-739 resins shows that the resin made without urea (JS-738) is more soluble on a quantitative basis than the JS-739. This evidence was adopted by the District Court under its discussion of Switzer's "24 hour quantitative test" (CT 116). According to Switzer, the JS-738 resin has a solubility of 0.020 grams per hundred milliliters of benzene while the JS-739 resin has a solubility of 0.010 grams per hundred milliliters. A second test conducted by Switzer showed that 0.007 grams of the JS-738 resin would dissolve per hundred milliliters of toluene, compared with only 0.002 grams of the JS-739 resin. Thus, Switzer's own figures show that on a quantitative basis, 7-4-1 resins formed without a half mole of urea are twice as soluble in benzene as those containing urea, and more than *three* times as soluble in toluene.

The accused 4-C pigments, as previously indicated, are made in the molar proportions 7-4-1 with respect to the essential three ingredients of the Kazenas patent. In addition, the accused pigments are made with oxalic acid, a dyestuff and one-half mole of urea (RT 342-343; Pcx R-1). Although both the JS-738 and JS-739 resins agglomerated in benzene in seven weeks (and therefore do not qualify as resins which are substantially insoluble in aromatic hydrocarbon solvents), neither of those resins is the same as the accused pigments. Both resins lack the oxalic acid and the dyestuff of the accused pigment. Those differences account for the fact that neither the JS-738 resin nor the JS-739 resin are as free flowing in aromatic hydrocarbon solvents as the accused pigments.

In the contempt trial, Radiant proved that the accused pigments would remain free flowing in *both* benzene and toluene for more than two years (Pcx R-38 and R-39). Pcx R-38 is a test tube containing the 4-C pigment in benzene (RT 374). The 4-C pigment was placed in the benzene on July 2, 1963 and yet at the time of trial it could be made free flowing by shaking (RT 375). Another exhibit, Pcx R-39, proved that the same resin had remained in-

soluble and free flowing in toluene (RT 376-377). This is a clear demonstration of what this Court meant when it said that a patented resin was one which "remains insoluble in aromatic hydrocarbon solvents". The only difference between the accused pigment and the patented Kazenas resin is that the accused pigment is made free flowing by something other than the melamine alone.

But this difference is one which Switzer in its brief on the first appeal brought forward to sustain the validity of the claims when it recognized, page 50:

" . . . If any means other than a sufficient amount of the melamine component were used to render the resin insoluble in aromatic hydrocarbons, the claim would not cover the resulting resin."

Importantly, Radiant does *not* contend that the JS-739 resin could be used as a substitute for Radiant's 4-C resin. Mr. Benahmias, one of Radiant's experts, clearly stated that neither the JS-738 nor the JS-739 resin could be used as a substitute for the 4-C resin (RT 505, 473). Radiant does contend that the half mole of urea and other raw materials used to make the accused pigment contribute materially to the ability of the pigment to remain free flowing for a long period of time. The evidence clearly supports Radiant's contention and refutes a finding to the contrary.

Specifications of error numbers 21 and 22 should be sustained.

Summary on contempt issues

The remaining specifications of error, namely specifications 23 through 25, are conclusionary specifications directed to the ultimate issue as to whether the amount of melamine in the accused pigment is sufficient to render the product substantially insoluble in aromatic hydrocarbon solvents. These specifications, therefore, turn upon the results of the argument on underlying specifications 1 through 22, both inclusive. Radiant submits that when the evidence is viewed as a whole, the facts themselves are not in substantial dispute. There is little doubt that each of the chemists conducted the experiments as to which he testified in the manner

set forth in his testimony. The true dispute is a legal dispute as to which experiments, how many experiments, and what kind of experiments are necessary to fulfill the simple clear test requirement which Switzer represented was available at the time of the original hearing on the first appeal. On this legal issue, Switzer should have been bound by the representations which it made to this Court on the first appeal and Radiant should have been permitted to rely upon simple experiments utilizing the same raw ingredients, the same proportions and the same time-temperature relationships as those which it used in making the accused pigment. Any other test or experiment would leave the claims far too indefinite and uncertain to meet the requirements of U.S. Code, Title 35, Section 112.

To these specifications, the views expressed in *Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co.* (7 Cir. 1952), 196 F.2d 103, at page 109, are most germane:

"We suspect, however, that plaintiff's failure previously to advance its present definition of 'a major proportion' was due to the realization that such a concession would place in serious question the validity of the claims. If 'a major proportion' means or can be interpreted to mean any percent—10, 20 or 40—their validity would be open to serious challenge because of their indefiniteness and uncertainty. As the Supreme Court said, first decision, 336 U.S. at page 277, 69 S.Ct. at page 538, 'The statute makes provision for specification separately from the claims and requires that the latter "shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery."' (Title 35 U.S.C.A. § 33.) These observations, of course, are not intended to reflect upon the validity of the claims, but they are such that we should hesitate to now accede to an interpretation which, if it had been made at the time their validity was under attack, would in all probability have resulted in a contrary decision on that issue."

THE CONTEMPT ORDER SHOULD BE REVERSED BECAUSE THE SUPPORTING EVIDENCE PROVES THAT THE KAZENAS PATENT VIOLATES 35 U.S.C. 112

We have shown above, in answer to the first question posed on this appeal, that the contempt order should be reversed—on

its own merits—because it is clearly erroneous in light of the record and prior opinions of this Court. We now turn to the second question which asks this Court, independently of its decision on the first question, to now redetermine whether the Kazenas patent violates U. S. Code, Title 35, Section 112. This second question is presented on the new circumstances which Switzer opened up on the contempt hearing, and the case law applicable to those circumstances.

That portion of Section 112 which is appropriate to this second question reads:

“The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.”

The burden which Radiant assumes on the merits of this second question is that the new circumstances and the case law applicable to those circumstances demonstrate that the claims do not particularly point out and distinctly claim any invention.

In posing this second question, Radiant concedes, as it must, the general proposition that the doctrine of “the law of the case” is normally binding on this Court upon this review. This Court has applied the general proposition, in patent and non-patent cases alike, in opinions too comprehensive in scope to leave any doubt that the doctrine of the law of the case upon a second appeal is one with strong and deep roots.¹ There is, however, another group of cases in which this Court has rejected the law of the case in order to conclude upon a subsequent appeal that its earlier decision was erroneous.² There is a third group of cases in which this Court has noted its power to re-examine its

1. *Clinton v. Joshua Hendy Corporation* (9 Cir. 1960), 285 F.2d 199, 200, cert. den. (1961), 366 U.S. 932; *Citizens Nat. T. & S. Bank of Los Angeles v. United States* (9 Cir. 1959), 270 F.2d 128, 132; and *Coleman Company v. Holly Manufacturing Company* (9 Cir. 1959), 269 F.2d 660, 664.

2. *Helms Bakeries v. C.I.R.* (9 Cir. 1959), 263 F.2d 642, 644, cert. den. (1959), 360 U.S. 903, reh. den. (1959), 361 U.S. 857; *United States v. Fullard-Leo* (9 Cir. 1946), 156 F.2d 756, 757, aff'd. (1947), 331 U.S. 256; and *Electrical Research Products v. Gross* (9 Cir. 1941), 120 F.2d 301, 307, reh. den. (1942), 125 F.2d 912.

earlier decision, but has reached the same conclusion on the second appeal as that which it had reached on the first appeal.³

The second question, therefore, of necessity first addresses itself to the power of this Court to reconsider its earlier decision on the first appeal and to reach a contrary conclusion on this appeal. We here show that many recent cases reflect an accelerating trend to qualify and depart from strict application of the rule of the law of the case. This trend, pinpointed in *Union Light, H. & P. Co. v. Blackwell's Adm'r.* (Ky. 1956), 291 S. W. 2d 539, 543, 87 A. L. R. 2d 264, 269, is evidenced in a fairly complete annotation "Erroneous decision as law of the case on subsequent appellate review", 87 A. L. R. 2d 271-360. That note points out:

"... The conflict in the authorities is a reflection of the existing conflict of two important principles governing the courts in the administration of justice. The first of these principles is that an erroneous judgment should not stand. The other is that at some time there must be an end to litigation and a final decision that parties can rely on. The ultimate test is which of these two principles is regarded more important for the administration of justice." (87 ALR 2d 278, footnotes omitted).

* * * * *

"The view relaxing the doctrine of the law of the case has been rested on the ground that an appellate court's duty to administer justice under the law outweighs its duty to be consistent." (87 ALR 2d 284, footnote omitted)

Mr. Justice Frankfurter, dissenting because the Court granted certiorari to affirm a Court of Appeals decision, had this to say in *Lawlor v. National Screen Service* (1957), 352 U.S. 992, 994:

"... In the federal courts 'the law of the case' is not a legal principle. It is a bogey that has been exposed, a ghost that has been laid, since Mr. Justice Holmes' opinion for the Court in *Messinger v. Anderson*, 225 U.S. 436, 444. The misuse of the rule of practice embodied in the conception of

3. *Cervantes v. United States* (9 Cir. 1960), 278 F.2d 350, 352; *Woodworkers Tool Works v. Byrne* (9 Cir. 1953), 202 F.2d 530; *City of Seattle v. Puget Sound Power & Light Co.* (9 Cir. 1926), 15 F.2d 794, 795, cert. den. (1927), 273 U.S. 752, 753; and *Pacific American Fisheries v. Hoof* (9 Cir. 1923), 291 Fed. 306, 309, cert. den. (1923), 263 U.S. 712.

'law of the case,' we had occasion to reject in *United States v. United States Smelting Refining & Mining Co.*, 339 U.S. 186, 198: 'It is not applicable here because when the case was first remanded, nothing was finally decided. The whole proceeding thereafter was *in fieri*.' . . ."

Mr. Justice Holmes' opinion for the Court in *Messenger v. Anderson* (1912), 225 U.S. 436, stated quite tersely, page 444:

" . . . In the absence of statute the phrase, law of the case, as applied to the effect of previous orders on the later action of the court rendering them in the same case, merely expresses the practice of courts generally to refuse to reopen what has been decided, not a limit to their power. . . ."

United States v. U. S. Smelting Co. (1950), 339 U.S. 186, quoted above in *Lawlor*, concludes, page 199:

" . . . We think that it requires a final judgment to sustain the application of the rule of the law of the case just as it does for the kindred rule of *res judicata*. Compare *United States v. Wallace Co.*, 336 U.S. 793, 800-801. And although the latter is a uniform rule, the 'law of the case' is only a discretionary rule of practice. It is not controlling here. See *Southern R. Co. v. Clift*, 260 U.S. 316, 319."

This Court's most recent departure from the general rule located by counsel is *Helms Bakeries v. C.I.R.* (9 Cir. 1959), 263 F.2d 642, cert. den. (1959), 360 U.S. 903, reh. den. (1959), 361 U.S. 857. In that case, this Court overruled an interpretation which it had placed upon the internal revenue code on the first appeal. At page 644, Judge Jertberg, speaking for this Court said:

"We have carefully reexamined the record in this case, and have reviewed our decision on the first appeal in the light of decisions cited by counsel before and after the submission of this cause. We have reached the conclusion that we were in error in assuming jurisdiction on the first appeal in respect to petitioner's claim for relief under section 772(b)(4). The 'law of the case' rule does not preclude us from overruling our prior decision on being convinced that our prior holding was erroneous. *White v. Higgins*, 1 Cir., 116 F.2d 312, and cases cited therein. . . ."

The next preceding decision located by counsel which relaxes the law of the case is *United States v. Fullard-Leo* (9 Cir. 1946),

156 F.2d 756, affirmed (1947), 331 U.S. 256. There, this Court *en banc* reconsidered its earlier opinion on the first appeal because of the novelty and importance of some of the questions presented and the division of opinion among the judges on the first appeal. Judge Healy, speaking for the entire bench, Judges Denman and Bone dissenting, said, page 757:

"Notwithstanding our decision on the former appeal we have authority, if we choose to exercise it, to re-examine the several aspects of the case. 'In the absence of statute the phrase, "law of the case," as applied to the effect of previous orders on the later action of the court rendering them in the same case, merely expresses the practice of courts generally to refuse to reopen what has been decided, not a limit to their power.' *Messinger v. Anderson*, 225 U.S. 436, 444, 32 S.Ct. 739, 740, 56 L.Ed. 1152. Cf., also, *Cochran v. M & M Transp. Co.*, 1 Cir., 110 F.2d 519, 521; *Electrical Research Products v. Gross*, 9 Cir., 120 F.2d 301, 308. While the power to re-examine questions previously determined should be sparingly exercised, there are occasions when justice requires that course. We think this is one of those occasions. The view of the case expressed in the minority opinion on the former appeal appears to the court as presently constituted to be the just view and it is thought that it should prevail."

In *Electrical Research Products v. Gross* (9 Cir. 1941), 120 F.2d 301, reh. den. (1942), 125 F.2d 912, this Court reconsidered its pronouncements on the first appeal and continued, page 307:

". . . These pronouncements are said to be the law of the case. But the record on the former appeal did not contain appellant's books of account; nor does the opinion contain any discussion of the subject of duress, except insofar as it formed the basis of appellee's counterclaims. Under these circumstances the former decision is not controlling."

In other jurisdictions deciding like the second group of cases in this Circuit, the law of the case has been relaxed where the circumstances on the second appeal indicate clear error in the decision reached on the first appeal. In one line of cases, the prior decision was overruled because of intervening decisions of

controlling federal or state courts.⁴ In another line of cases, courts overruled their prior decision because the record on the second appeal presented substantially different circumstances from those stated on the first appeal.⁵ In still another line of cases, the decision on the prior appeal was overruled apparently simply to reexamine questions which were overlooked or incorrectly decided on the first appeal.⁶

The Supreme Court in the case at bar did deny certiorari on the first appeal, but it appears from the cases that this is not a controlling factor. In many of the cases, the courts have overruled their prior opinion notwithstanding the denial of the writ of certiorari on the first appeal.⁷

With this foreword, we turn to the considerations which we urge should persuade this Court to undertake a reconsideration of the question as to whether the Kazenas patent violates U. S. Code, Title 35, Section 112.

The prior appeal decision is interlocutory

An important element enabling relaxation of the law of the case is that the prior appeal was interlocutory. The judgment

4. *Page v. St. Louis Southwestern Railway Co.* (5 Cir. 1965), 349 F.2d 820, 821; *Maryland Casualty Company v. Hallatt* (5 Cir. 1964), 326 F.2d 275, 276-277; *Connor v. New York Times Company* (5 Cir. 1962), 310 F.2d 133, 135; *Higgins v. California Prune & Apricot Grower* (2 Cir. 1924), 3 F.2d 896, 898; *Luminous Unit Co. v. Freeman-Sweet Co.* (7 Cir. 1924), 3 F.2d 577, 579-580; and *Johnson v. Cadillac Motor Car Co.* (2 Cir. 1919), 261 Fed. 878.

5. *Chicago, Rock Island & P. R. Co. v. Hugh Breeding, Inc.* (10 Cir. 1957), 247 F.2d 217, 223; *City of Sedalia v. Shell Petroleum Corporation* (8 Cir. 1936), 81 F.2d 193, 196; and *Rogers v. Chicago, R.I. & P. Ry. Co.* (8 Cir. 1930), 39 F.2d 601, 604.

6. *In re Inland Gas Corp.* (6 Cir. 1951), 187 F.2d 813; *Commercial Nat. Bank in Shreveport v. Connolly* (5 Cir. 1949), 176 F.2d 1004; *Connett v. City of Jerseyville* (7 Cir. 1940), 110 F.2d 1015; and *Seagraves v. Wallace* (5 Cir. 1934), 69 F.2d 163, 164-165.

7. *Maryland Casualty Company v. Hallatt* (5 Cir. 1964), 326 F.2d 275, cert. den. (1962), 369 U.S. 819; *In re Inland Gas Corp.* (6 Cir. 1951), 187 F.2d 813, cert. den. (1946), 329 U.S. 737; *City of Sedalia v. Shell Petroleum Corporation* (8 Cir. 1936), 81 F.2d 193, cert. den. (1933), 290 U.S. 706; *Seagraves v. Wallace* (5 Cir. 1934), 69 F.2d 163, cert. den. (1930), 282 U.S. 871; and *Luminous Unit Co. v. Freeman-Sweet Co.* (7 Cir. 1924), 3 F.2d 577, cert. den. (1919), 253 U.S. 486.

under review on that appeal held the Kazenas patent valid and infringed and retained jurisdiction of the cause so that it could "hereafter set this matter down for hearing as to the amount of damages." (OR 210). The cause was referred to Joseph P. Karesh on February 15, 1960 for an accounting of damages (CT 140); was reassigned to Donald B. Constine on April 2, 1962 (CT 143); and was reassigned to Richard S. Goldsmith on October 20, 1964 (CT 149). The accounting is still pending and no final judgment has been rendered in the court below (CT 149-154). The decision on the contempt proceedings is based upon an injunction granted pursuant to that interlocutory judgment.

There can be little doubt, we submit, that the judgment of validity and infringement thus entered is interlocutory and subject to the continuing control of this Court until the entry of final judgment. This conclusion follows from *Marconi Wireless Co. v. U. S.* (1943), 320 U. S. 1, 47-48; and *Simmons Co. v. Grier Bros. Co.* (1922), 258 U. S. 82, 90-91. In *Marconi Wireless*, the court specifically held, page 47, that an interlocutory decision of the trial court on the question of validity and infringement "was not final until the conclusion of the accounting." Upon such an understanding, the court concluded:

"... Hence the court did not lack power at any time prior to entry of its final judgment at the close of the accounting to reconsider any portion of its decision and reopen any part of the case. *Perkins v. Fourniquet*, 6 How. 206, 208; *McGourkey v. Toledo & Ohio Central Ry. Co.*, 146 U. S. 536, 544; *Simmons Co. v. Grier Bros. Co.*, *supra*, 90-91. It was free in its discretion to grant a reargument based either on all the evidence then of record or only the evidence before the court when it rendered its interlocutory decision, or to reopen the case for further evidence."

In *Simmons Co. v. Grier Bros. Co.* (1922), 258 U. S. 82, the court said, page 89:

"The decree of July 24, 1914, although following a 'final hearing', was not a final decree. It granted to plaintiffs a permanent injunction upon both grounds, but an accounting was necessary to bring the suit to a conclusion upon the

merits. An appeal taken to the Circuit Court of Appeals, whose jurisdiction, under § 129 Judicial Code, extended to the revision of interlocutory decrees granting injunctions, followed by the decision of that court reversing in part and affirming in part, did not result in a decree more final than the one reviewed. . . .”

At page 88, the court pointed out that a bill of review follows of final decree and continues:

“. . . If it be only interlocutory, the court at any time before final decree may modify or rescind it. . . .”

The interlocutory character of the judgment under review brings into play the rule “that it requires a final judgment to sustain the application of the rule of the law of the case. . . .” [*United States v. U. S. Smelting Co.* (1950), 339 U. S. 186, 199].

Or, as said in *Connor v. New York Times Company* (5 Cir. 1962), 310 F.2d 133, 135:

“The previous decision of this Court on interlocutory appeal is not binding either as the law of the case or as res judicata, both because it was not a final judgment and because there has been an intervening decision of the Supreme Court of Alabama creating an altered situation. (citations omitted.)”

The application of U. S. Code, Title 35, Section 112 was not fully covered in the first opinion

Another factor which warrants relaxation of the law of the case doctrine is that this Court in its earlier opinion did not discuss one aspect of the statutory defense, i.e., that the claims are indefinite in the area of the alleged novelty. Specification of error 32 in Appellants’ Opening Brief on the first appeal (p. 40) urged error in that the claims did not comply with the statute. In the supporting argument, it was urged that the violation was based “on two separate bases: the first, that the claims are functional at the exact point of novelty; and the second, that they are indefinite.” (p. 79). The first basis was argued at pages 79-90 of Appellants’ Opening Brief and this Court directed its opinion to that basis. The second point urging that they are indefinite was argued at pages 90-95 of Appellants’ Opening

Brief, but it was not mentioned in the opinion of this Court nor were any of the decisions touching upon that issue discussed in the prior opinion. As a consequence, we submit, the inherent rejection of appellants' argument on the prior opinion is not the law of the case on this second appeal.

The rule which Radiant asks this Court thus to follow was applied in *Hartford Life Ins. Co. v. Blincoe* (1921), 255 U. S. 129, at page 136:

"Counsel, however, admit that the question of the inclusion of the tax was not discussed, but insist that 'the question was in the record, was necessarily involved, and was presented,' and invoke the presumption that whatever was within the issue was decided. In other words, that the case was conclusive not only of all that was decided, but of all that might have been decided.

"From our statement of the issues it is manifest that the quotation from the opinion has other explanation than counsel's, and we need not dwell upon the presumption invoked or the extent of its application in a proper case. The question of the effect of a judgment as a bar or estoppel against the prosecution of a second action upon the same claim or demand, or its effect upon a particular issue or question in some other case, is not here involved. The most that can be said of any question that was decided is, that it became the law of the case and as such binding on the Supreme Court of the State, and to what extent binding is explained in *Messenger v. Anderson*, 225 U. S. 436. Certainly, omissions do not constitute a part of a decision and become the law of the case, nor does a contention of counsel not responded to. The element of taxes in the assessment was not considered by the Supreme Court, and in this court the Connecticut judgment and its effect were the prominent and determining factors. The question of the inclusion of the tax was not discussed or even referred to. . . ."

In the case at bar, likewise, the predominant and determining factor which this Court discussed in considering the statutory defense was whether the claims were functional at the precise point of novelty. The element of indefiniteness of the indeterminate language of the claims was not discussed or even mentioned in the prior opinion.

One distinction which can be made in the *Hartford* case is that there the first appeal decision was a reversal, whereas in the case at bar the first decision was an affirmance. This factor does not truly warrant a departure from *Hartford*. This is shown in *Reynolds Spring Co. v. L. A. Young Industries* (6 Cir. 1939), 101 F.2d 257. That appeal from a final judgment in a patent infringement accounting followed the affirmance of the interlocutory judgment in *Reynolds Spring Co. v. L. A. Young Industries* (6 Cir. 1929), 36 F.2d 150. On the first appeal, defendant raised the defense of license and this defense was rejected without discussion in the opinion on the first appeal. The defendant again raised the same defense on the second appeal. On the second appeal, the court considered the defense on the merits on the second appeal, albeit the decision on the merits was adverse. In concluding that it should give the defense full consideration on the second appeal, the court said (101 F.2d 259):

"Appellant insists that it was an implied licensee insofar as it sold any devices embodying appellee's invention to the Ford and Chevrolet Companies. Appellee urges two procedural objections to this question being considered on this appeal, the first of which is that on the former trial in the district court it found that appellant was not an implied licensee and that error was assigned to that ruling on the former appeal to this court, and thus the law of the case was established.

"An examination of the record shows that error was assigned to the ruling of the district court, but the opinion of this court shows that it was not considered on appeal.

"It is a well-recognized rule that an appellate court on a second appeal may review and revise a conclusion reached on the first appeal, it becoming the law of the case only as to the lower court. . . ."

There has been a significant change in facts and circumstances warranting a review of the earlier decision

One of the factors which has persuaded courts to reconsider their own decisions on prior appeal has been a change in facts and circumstances intervening the decision on the first appeal and the hearing on the second. In *City of Sedalia v. Shell Petro-*

leum Corporation (8 Cir. 1936), 81 F. 2d 193, the court said, page 196:

" . . . It is well settled that the decision of an appellate court is ordinarily the law of that case on the points presented, binding in all subsequent proceedings on the lower court. If, however, the evidence is substantially different in material respects from that presented on the former appeal, the rule of the law of the case is not applicable. . . ."

And this Court, likewise, in *Electrical Research Products v. Gross* (9 Cir. 1941), 120 F.2d 301, reh. den. (1942), 125 F.2d 912, disregarded the law of the case in part because "the record on the former appeal did not contain appellant's books of account. . . ." (120 F.2d 307).

The new circumstances in this case are not brought about by Radiant in an effort to overturn the first decision. To the direct contrary, the evidence to which reference will be made in this section of the brief refers only to circumstances which Switzer interjected into this case in order to prove up a case of infringement on the contempt matter. In other words, Switzer took the position that these claims were most elastic and Switzer evoked the evidence which now proves that the Court committed error in reaching its original understanding that the claims had distinct and particular meaning.

Switzer has now proved that there is no critical point which remains the same for each melamine compound.

In rejecting Radiant's defense that the limits of melamine are expressed in functional language, this Court distinguished *Gen. Electric Co. v. Wabash Co.* (1938), 304 U. S. 364, in part upon the following representations of Switzer (299 F.2d 165-166):

"In our case Switzer, in justification of the functional language, points out that the alternative would have been to state the critical lower limits precisely. This was done in the examples set forth in the specification. Switzer *points to the fact that of the considerable number of melamine compounds encompassed by the patent, each has a different critical limit.* It asserts that this renders it wholly unreason-

able to expect the claims to be specific in this respect or to expect any further specificity than that which appears in the examples given.

"In the General Electric case, the effect of the functional language was to broaden the claim to include *all* grains of whatever size or shape so long as they would accomplish the desired result. In our case the critical area is not enlarged in such a fashion. *The critical point remains the same for each melamine compound used.* It simply is not specified. But whether specified or unspecified the scope of the claim is precisely that of the invention." (emphasis added).

In the contempt hearings, Switzer proved that the italicized representations simply were not true.

Thomas J. Gray was the first witness on behalf of Switzer (RT 46). He is house counsel for Switzer. In addition to his law degree, Mr. Gray has a Master of Science degree in chemistry from Western Reserve University (RT 49). He became experienced in research and development work in the Switzer laboratory and did chemical experimental work in the laboratory in connection with legal and patent matters in which Switzer was involved (RT 50). He made the experimental test resins which Dr. Hatcher explained at the original trial (OR 462).

On September 25, 1965, Mr. Gray performed an inter partes experiment using the molecular proportions of melamine, formaldehyde and sulfonamide in the same ratio as the accused resin used melamine, sulfonamide and formaldehyde (RT 123). The purpose was to see if the resin could be made in 7-4-1 proportions and then be tested as to its solubility in aromatic hydrocarbon solvents (RT 128). On cross-examination, he was asked if this was the first test which he had made on such a three component resin (RT 136):

"Q. Now, how many tests are you aware of which Switzer Brothers, Inc., had made with these proportions of 7-4-1 that we have been speaking of, from the time of the first test that you know somebody made in your plant up until the time that you made your test on September 25, 1965?

"A. Well, may I explain one matter, Mr. Hoppe? The

purpose of my tests was not to determine if I could put together a 7-4-1 resin because I was confident that I could do this. The purpose of my tests were to determine if I could put together this resin within time and temperature limitations which I was imposing, and as a result I would say that there probably were maybe a dozen or a dozen and a half tests until I was satisfied that I had met the time and temperature limitations.

"Q. Now, on any of these tests that you made prior to September 25, 1965, did you test any of the powdered resin that was made in those tests for qualitative insolubility in aromatic hydrocarbon solvents?

"A. Yes.

"Q. On how many occasions did you do that?

"A. Maybe a half dozen of them."

He was also asked the following questions and gave the following answers (RT 137):

"Q. Now, with respect to any of your tests prior to September 25, 1965, did you observe that any of those test resins were such that the resin did in time agglomerate in Benzene?

"A. I think some of them did, some did not.

"Q. Some of them did and some didn't? What is the shortest period of time that some agglomerated in Benzene?

"A. If my recollection serves me right, the shortest time we tested, or the time we tested, was one week.

"Q. And within one week on some of these 7-4-1 tests that you made you found agglomeration within a week?

"A. That's right.

"Q. On the tests where you found agglomeration within a week did you use the same kind of toluenesulfonamide, the same kind and brand of paraformaldehyde, and the same kind and brand of melamine which you used in the test which you made on September 25th?

"A. Yes, I believe so."

We submit that when one can use the same three identical ingredients and proportions and reach such diverse results that some will agglomerate earlier than others, that the first representation that the critical limit remains the same is unfounded.

Further, in connection with the solubility tests, Mr. Gray was asked the following questions on cross-examination and gave the following answers (RT 163-164):

"Q. Now, when this contempt citation was filed against, or the contempt petition was filed against Radiant Color Company in this case did you have any consideration of what the words in the opinion of the Court of Appeals on the first appeal meant when the Court of Appeals said: The Kazenas patent is for a resin which is a co-condensation of all three of these chemical components and which is thermo-plastic but still is capable of being finely ground and which remains insoluble without agglomeration in aromatic hydro-carbon solvents.

Have you given any consideration to those words before the contempt citation was filed here?

"A. I don't recall, Mr. Hoppe.

"Q. To a person who is a chemist in the paint field what is the usual meaning that you would attach to the word 'remains'?

"A. Over some period of time it isn't soluble.

"Q. Is it more than a day?

"A. It may or may not be, depends upon your tests.

"Q. Is it more than a week?

"A. It can be.

"Q. Is a paint in which the pigment is insoluble without agglomeration in aromatic hydrocarbon solvents in which the stuff will be agglomerated within a day, is that a salable paint?

"A. No.

"Q. Is it salable if it will remain suspended for one week?

"A. Probably not. It depends on your use and your customer."

Again, Radiant submits that any test which "depends on your use and your customer" is not one which can possibly remain the same for each different melamine component.

Switzer's second witness on the contempt proceedings was Dr. William von Fischer (RT 192). He is vice president of Switzer and has been in research and development work since at least as early as 1956 (RT 192-193). He has a Bachelor of

Chemistry degree, a Master of Science degree and a Doctor of Philosophy, all in the field of chemistry (RT 193). With respect to solubility, Dr. von Fischer testified on direct examination (RT 228-230):

"MR. SHERMAN: Q. Dr. von Fischer, we have had a good deal of discussion about the meaning of certain words, soluble and insoluble. Will you give me your definition of those words?

"A. Well, my definition would be in line with those given in the Van Nostrand Chemist's Dictionary.

"Q. I shall hand up to you, then, Defendant's Exhibit S-42, a copy of the frontal page and two pages of Van Nostrand's chemist's dictionary.

"A. This is from a volume that was copyrighted in 1953. The term 'soluble' is here defined as: 'Capable of dissolving, i.e., of forming a single, homogenous phase with a specified solid or liquid.'

"Q. What does the term phase mean, if I may ask?

"A. A single state. Actually I use the word state normally in my own definition. A one-phase condition is a one-state condition.

"Q. A one state of matter?

"A. One state of matter in a physical sense.

"Q. Please proceed.

"A. And 'insoluble' is here defined as 'Not dissolving in a solvent (except in minute amounts).'

"Q. Now, what do you understand, if any, is the difference between 'substantially insoluble' and 'practically insoluble'?

"A. Well, the two are relative terms and in a practical sense, as here defined, insoluble indicates that very minute amounts may still be dissolved in the solution or in the solvent, but from a practical standpoint relatively insoluble.

"Q. Then you have answered my next question: Is the term 'soluble' a relative or an absolute term.

"A. The word soluble itself?

"Q. Yes.

"A. Well, the word soluble is not a quantitative expression as such, if I may say that, it is a relative one and that it would allow for a wide variance in the amounts of materials that would dissolve.

"Q. And does that also apply to the term insoluble?

"A. Yes, again in a relative sense insoluble as taken for the practical meaning would allow minute amounts of material, small amounts of material to be dissolved depending on the practical application that we are considering."

On cross-examination, with regard to this subject matter, Dr. von Fischer was asked the following questions and gave the following answers (RT 248):

"Q. Now, in defining solubility you relied in part on Exhibit S-42 which is the Van Nostrand Dictionary where the definition for insoluble is not dissolving in a solvent (except in minute amounts).

In the resin field what is a minute amount?

"A. This would depend on the conditions under which the resin is used. It is a practical consideration.

"Q. Would you state any condition, any practical consideration which would enable you to determine what a minute amount is and state what that practical consideration is and then put a number on the minute.

"A. The practical consideration would be to use the resin in the application or type of application to which it would be used, or its industrial purpose, to see whether or not it would work satisfactorily, and this could not be related with a number figure."

On this same subject matter, Dr. von Fischer was asked the following questions and gave the following answers (RT 250):

"Q. Now, with reference to the insolubility which has the minute amount and the soluble definition which doesn't define the amount, in between those two concepts of soluble and insoluble we have the concept that something is substantially insoluble, don't we?

"A. Yes, substantially insoluble is certainly approaching the insoluble as here defined.

"Q. Now, something that is substantially insoluble to you as a chemist means something that is less insoluble than something that is insoluble, does it not?

"A. Yes, in a relative sense that is correct.

"Q. Now, have you made any—

"A. I am very sorry, will you restate that question?

"Q. Well, I will restate the question that when we consider the academic concept that something is soluble and we consider the academic concept that something is insoluble,

we have those pretty well defined, as I understand your testimony, once we know the meaning of the word minute, but we now know what soluble and insoluble is. Now, we want to find out what the meaning of the words 'substantially insoluble' is under the definitions which you have used here and that would be something in between, something which is insoluble and something which is soluble, would it not?

"A. Yes, but approaching the side that is insoluble.

"Q. Approaching the side that is insoluble. In other words, if something is substantially insoluble there would be more than minute amounts of a product in the solvent, would there not be?

"A. Yes, could be slightly more than in the insoluble.

"Q. All right. Now, how much slightly more than minute in your definition would one get before one changes from something which is substantially insoluble to something which is soluble?

"A. This again is relative and depends on the practical usage to which it is put.

"MR. SHERMAN: May I interpose an objection to this line of questioning? If by the questions the attorney for Radiant is trying to get this witness to define 'substantially' within the meaning that it is used in the claims of the patent in suit, that is for the construction of the Court.

"THE COURT: That may be and we will so regard the testimony.

"MR. HOPPE: Q. So this would be a relative term, then, as far as you are concerned?

"A. Yes, depending on the use, the practical usage of the material under consideration."

With specific reference to the claims of the patent, Dr. von Fischer was asked the following questions and gave the following answers (RT 253):

"MR. HOPPE: Q. I said in viewing the fact that you want to have a completely condensed thermoplastic resin which has these three ingredients, melamine, sulfonamide and the aldehyde in which you're told that the amount of melamine should not exceed 50 percent by weight and that you should have a sufficient amount of this melamine to render a condensation product substantially insoluble in

aromatic hydrocarbon solvents—understand what I am talking about so far?

"A. Yes.

"Q. Now, in that context do the words 'substantially insoluble' mean the same to you as they have meant in your oral testimony thus far?

"A. Yes. If I were to read this in a patent or in an advertisement of Switzer Brothers I would assume that these materials are basically insoluble and can be used in products for which pigments generally are used.

"Q. Yes. And in your testimony when you said that you thought that the products were insoluble you were not giving a different meaning to the word insoluble than you're giving right now in the reading of the words 'substantially insoluble' in that claim?

"A. Still depending on the use to which it is applied."

On the foregoing evidence, Switzer's representation that the critical limit remains the same, cannot be accepted as accurate. Again, there are such admitted variables as "It depends on your use and your customer"; "This again is relative and depends on the practical usage to which it is put"; ". . . depending on the use, the practical usage of the material under consideration."; and ". . . depending on the use to which it is applied" which must be considered in defining the limits of the patent claims. The critical limit does not remain the same as Switzer so glibly represented to this Court on the first appeal.

Thus, Switzer has now proved the same facts as those which Radiant unsuccessfully sought to bring out on its motion for a new trial based upon the deposition of Zenon Kazenas. Radiant there sought to show that Zenon Kazenas, in the infringement action brought against Lawter Chemicals, Inc., testified (OR 163):

"Q. Where would you place the main concentration of the amount of melamine or melamine formaldehyde that could be employed in the manufacture of the resin?

"A. I think it would be very difficult to place. You would have to place it depending upon what you wanted to do with the final resin that was obtained.

"Q. Let us say that we wanted to grind the resin up to form a pigment.

"A. Well, there again, where the pigment would be used, it would be a factor whether it is going to be used in a strong solvent or a weak solvent.

"Q. Will you explain to me, then, what the limitations would be as compared to what solvents you would employ?

"A. I would say for our purpose we would want something that was substantially insoluble in aromatic solvents and the aliphatics.

"Q. And what amount of melamine or melamine formaldehyde would be required to give you that characteristic?

"A. I don't think you could pin it down to one definite per cent, because there is a wide variety of aromatic solvents. What I might choose in one particular aromatic solvent might not be useful in another and so I wouldn't pin it down to any definite per cent.

"Q. I will let you select the aromatic solvent and give me the per cent for it.

"A. I don't believe I can do that, because I have not performed a sufficient number of experiments to pin it down that closely. I wouldn't want to hazard any guesses without doing the work on it.

"Q. And you would prefer to leave the lower limit indefinite, is that right?

"A. Yes, I think that would be my idea."

Switzer successfully argued at page 71 of its brief that Radiant "should not be permitted to use, as evidence here, testimony of Mr. Kazenas taken in discovery in a different suit." Yet, Switzer on these contempt hearings has proven precisely that which Radiant sought to prove on the earlier motion. Such a change in circumstances should suffice, we submit, to illustrate the clear error into which Switzer led the District Court on the original trial and led this Court on the first appeal.

The circumstances which Switzer has now interjected into this case in order to redefine "substantially insoluble" were not before this Court on the first appeal except by indirection. On the first appeal, Radiant argued at length that the words "sufficient" and "substantially insoluble" are too indefinite to support the patent monopoly citing *Vitamin Technologists v. Wisconsin Alumni Research F.* (9 Cir. 1944, as amended 1945), 146 F. 2d 941; *Barkeij v. Lockheed Aircraft Corp.* (9 Cir. 1954), 210

F.2d 1; and *United Carbon Co. v. Binney Co.* (1942), 317 U.S. 228 (Appellants' Opening Brief on first appeal, pp. 90-95). Switzer in its brief for Defendant-Appellee did not answer these authorities nor did it answer the argument based upon such authorities, all as was pointed out in Appellants' Reply Brief, pp. 10-11. This Court did not touch upon the argument in its first opinion. The new circumstances, Radiant submits most respectfully, confirm the fact of the indefiniteness upon which Radiant relied and the applicability of Radiant's authorities.

Switzer's experts have now proved that the present case cannot be distinguished in principle from any of the cited authorities. By way of example, in *United Carbon Co. v. Binney Co.* (1942), 317 U. S. 228, the patentee relied in part on "a rough and ready test" to identify the patented product which consisted in testing the product for survival under gentle rubbing of the fingers. Such a test corresponds to the rough and ready test of substantial insolubility now suggested by Switzer. On another factor, that of friability, the Court said, page 233, ". . . The correct degree of friability can be ascertained only by testing the performance of the product in actual processes of manufacture of products of which carbon black is a component." Switzer's experts have now shown that the correct degree of solubility can be ascertained only by testing the performance of the product depending upon the use, the practical usage of the material under consideration and the demands of the consumer. Under the analogous facts thus discussed, *United Carbon* held the claims there in suit bad for indefiniteness. Radiant, therefore, submits that Switzer has shown that the facts in this case render the claims indefinite under the rule of *United Carbon*. Radiant submits that the claims should be held invalid on that basis.

Switzer's proofs also show that there is a true parallel between the present record and the record in *Vitamin Technologists v. Wisconsin Alumni Research F.* (9 Cir. 1944, as amended 1945), 146 F.2d 941. In that case, the novelty in the claim provided for the irradiation of food products by ultra-violet rays "for a period sufficient to effect antirachitic activation but so limited as to avoid subsequent substantial injury" to the product (146 F.2d 947).

This Court held those claims to be invalid because of indefiniteness of the area of the claimed monopoly. The patentee testified that the phrase "might have different meanings according to the economic or physiological conditions which may be present in any situation" (146 F.2d 950), just as Switzer's experts here have testified that the term "substantially insoluble" might have different meanings depending upon the end use of the product and the needs of the customer. This Court held the claims invalid for failure to comply with U. S. Code, Title 35, former Section 33 (now Section 112) on the authority of *United Carbon Co. v. Binney Co.* (1942), 317 U. S. 228 and *Gen. Electric Co. v. Wabash Co.* (1938), 304 U. S. 364. With reference to the words "sufficient" and "substantial", the Court had this to say, page 951:

"It is contended that there would be difficulty in stating with definiteness the amount of the functions of exposure which would be 'sufficient' or 'substantial.' Such a difficulty shows the doubt which would affect the minds of all other investigators and prospective inventors in the field. . . ."

Switzer's new proofs have further made it clear that there is a true analogy between the facts in this case and the facts in *Hall Laboratories v. Economics Laboratory* (8 Cir. 1948), 169 F.2d 65. That case referred to washing compounds in which one of the ingredients was a metaphosphate. At page 68, the Court said:

"The evidence is that the terms 'alkali-metal metaphosphate' and 'a deflocculative detergent capable of peptizing greases' used in claim 28 of Patent Re 19719 are descriptive and understandable to those skilled in the art but the uncertainty of the claim is in the application of the limitation 'which is water soluble and capable of sequestering calcium in a but slightly ionized condition' to the ascertainment of what amounts of which alkali metaphosphates are intended to be claimed. Likewise, in claim 10 of Patent 2035652 the limitation 'the sodium hexametaphosphate being in amount sufficient to prevent the precipitation of calcium soap in the washing of greasy articles in such highly alkaline solution' is a quantitative limitation. Under 28 there must be the right kind and enough of a metaphosphate to be water soluble and capable of the stated sequestration of calcium, and under 10 enough of the sodium hexametaphosphate to function in one

circumstance and then enough to function in another, and there is no specification of proportions identifying the claims with a particular new composition. Therefore a given composition can not be established as infringing either claim 10 or claim 28 without resorting to a performance in use test because in each the product is described in terms of functions. The claims use functional language at the point of novelty. . . .”

Later in its decision, the Court said, page 69:

“ . . . it is in fact necessary to resort to use and experiment to determine whether or not a composition makes use of the discoveries claimed in these patents. The insufficiency of the claim descriptions appears therefore as an actual fact constituting a real impediment to practice of the art so that it is not necessary to rely on the abstract declaration of law or statement of doctrine of the cited case.”

The Court there had reference to *Gen. Electric Co. v. Wabash Co.* (1938), 304 U. S. 364.

Further, in *Standard Oil Co. v. Tide Water Associated Oil Co.* (3 Cir. 1946), 154 F.2d 579, the court held invalid as being indefinite a claim for a process of removing sulphur from motor fuels which consisted of contacting the fuel “with sulphuric acid of such strength and quantity as to have the capacity at low temperatures of selectively removing a part of the sulphur bodies and to polymerize a further part of said bodies and to effect a material rise of temperature of reaction unless restrained” (154 F.2d 580-581). The court held such claims invalid for failure to comply with the rules laid down in *Gen. Electric Co. v. Wabash Co.* (1938), 304 U. S. 364; *United Carbon Co. v. Binney Co.* (1942), 317 U. S. 228; and *Standard Brands v. Yeast Corp.* (1939), 308 U. S. 34. In applying the statute and the cases, the Court said, pages 582-583:

“ . . . The public policy behind the statute may be seen to be as strongly grounded in the necessity for adequate notice as it is in the necessity to teach. The burden is on the inventor to say precisely what he has done. He must speak so clearly that he does not shift that burden to others who because of his failure to be more explicit may unwittingly invade the field covered by the patentee.

"The most immediate test of sufficiency of precision in description following from the policy just outlined is that no inventor may compel independent experimentation by others to ascertain the bounds of his claims. This Court in the Standard Brands case so ruled before and the Supreme Court in the same case agreed. Equally necessary in derivation is the rule that difficulty in securing exactness does not mean a description may fall short of the requirements of the statute. . . ."

Switzer has now proved that the general description does not define the invention

The next reason which this Court assigned for sustaining the validity of the claims is set forth at 299 F.2d 160, 166:

"Nor can it be said that this failure to specify the critical limit precisely results in a fatal vagueness of description. The claim must be sufficiently clear to allow others to reproduce the result at the end of the monopoly period and to enable contemporary inventors to ascertain whether or not they are infringing.

"Upon this point the district court concluded:

'When the general description, the specific examples, and the claims are read together, the invention is so plainly defined that no one skilled in the art should have any difficulty in practicing it.'

The record supports this statement. . . ."

Switzer, on the contempt hearing, has now disowned any construction of the prior record which supported the conclusion that "the invention is so plainly defined" in the general description of the Kazenas patent. With regard to the general description upon which the District Court relied, as shown in the quoted material, Switzer now shows that those portions of the record which it urged earlier as support for the claim actually are in contrast with the claim limitation.

At the original trial, on cross-examination, Dr. Hatcher was asked the following questions and gave the following answers (OR 423-424):

"Q. Where do you find in the Kazenas patent a teaching that the solubility in aromatic hydrocarbon solvents is keyed to the quantity of melamine?

"A. In reading the entire patent it gives that impression, that enough melamine is required to achieve that result.

"Q. Would you please read one sentence that gives that expression?

"A. I did in just reading the first column, starting about Line 30, it is speaking of the thermoplastic resin, and it says down about Line 43, 'On the other hand, the new resin, unlike the melamine-aldehyde resins, is soluble in certain solvents and is thermoplastic.'

No, that isn't the one I was searching for.

"Q. Do you find any language in there referring to insolubility in aromatic hydrocarbon solvents?

"A. Not there. In the patent I do. I find it in a number of places.

"Q. Well, let's find one.

"A. Let's take Column 1, Line 57:

'The new resin is insoluble in many common vehicles and can therefore be suspended in such vehicles without coalescence or agglomeration.'

The common vehicles are, normally, of an aromatic nature."

On redirect examination, he was asked the following questions and gave the following answers (OR 468-469):

"Q. Dr. Hatcher, you were also asked if you would examine the Kazenas patent and find any statements relating to—Oh, strike that question.

You were asked to examine the Kazenas patent and find any statements which would lead you to believe that the melamine content of the Kazenas resin was such that it was insoluble in aromatic hydrocarbon solvents, and you did examine the patent during the recess but you were not asked the question again on cross-examination. I will ask it to you now.

"A. Yes, I find four references to it.

"Q. Could you read those, please?

"A. On Column 1, line 57, it says:

'The new resin is brittle and friable below its softening point'—No, that's not it. 'The new resin is insoluble in many common vehicles and can therefore be suspended in such vehicles without coalescence or agglomeration.'

Then going to Column 5, the portion that we just read where it says, 'If desired, the undyed resin may be pre-

pared as in Examples 1 to 6 and dyed by immersion in an aqueous dye bath,' which refers on to Column 6 where it says at line 4:

'The pigments prepared in the manner described in [232] the foregoing examples are insoluble in water and aliphatic hydrocarbon solvents, are practically insoluble in aromatic hydrocarbon solvents, and are soluble in ketones and solvent esters.'

Then in that same column, line 21,

'Based on these physical characteristics, the pigments may be used in vehicles which are non-solvents for the pigments to form various types of inks and the like.'

These would lead to the very strong conclusion that they are unsoluble in aromatic solvents."

On recross-examination he was asked the following question and gave the following answer (OR 474-475):

"Q. (By Mr. Hoppe): Dr. Hatcher, to a man skilled in the art, is there any difference between being soluble in common vehicles and the usual solvents? This is without reference to the patent. I am just asking you about the words 'common vehicles' and 'usual solvents.'

"A. There could be some difference, slight difference. Here I am sure it is meant in that manner, however."

Clearly, Dr. Hatcher there told the District Court that there was a true relationship between the words "substantially insoluble in aromatic hydrocarbon solvents" and the words "the new resin is insoluble in many common vehicles and can therefore be suspended in such vehicles without coalescence or agglomeration." Indeed, this Court so considered the description in the specification. For example, this Court found (299 F.2d 162-163), "The Kazenas patent is for a resin . . . which remains insoluble without agglomeration in aromatic hydrocarbon solvents."

In the Brief for Defendant-Appellee, Switzer positively pointed out to this Court, page 23:

"The insolubility of the resin in aromatic hydrocarbons which may be used as paint vehicles is critical in this situation (R. 397). The resin must be so insoluble that its particles do not agglomerate—i.e. remain free-flowing—if they are to function satisfactorily as discrete pigment particles (R. 400)."

Later, at page 37 of its brief, Switzer argued:

"... With respect to the limitation in question, on direct examination (R. 395) Dr. Hatcher positively testified that the Kazenas patent teaches 'there must be sufficient melamine content to cause insolubility in aromatic solvents'; and he reaffirmed his position in answer to a cross-examination question (R. 468-469) by quoting passages from the Kazenas disclosure in detail. Later in its brief (R.O.B. 79), Radiant even quotes this portion of Dr. Hatcher's testimony with approval."

Now, on the contempt proceedings, Mr. Gray testified that the expression "practically insoluble in aromatic hydrocarbon solvents" means that "They have a very low solubility in those solvents." (RT. 72) and the expression "The new resin is insoluble in many common vehicles and can therefore be suspended in such vehicles without coalescence or agglomeration" means that "... these resins can be used as pigment resins in the common paint vehicles, can be redispersed after standing for some period of time." (RT. 73).

At RT. 74, Mr. Gray further stated the following:

"MR. SHERMAN: Q. Now, what distinction, if any, do you draw between these two quotations, one with reference to aromatic hydrocarbon solvents and the other to the common vehicles?

"A. Aromatic hydrocarbon solvents would be the pure solvents, and the patent states that they shall be practically insoluble in those materials. With respect to the vehicles, they say again that they are to be insoluble in those common vehicles, and in other language which I interpret to mean that they can be redispersed.

"Q. And that other language is 'without agglomeration'?

"A. Suspended in such vehicle without coalescence or agglomeration.

"THE COURT: Now, I still don't understand the testimony. You say that the language of the patent is 'Practically insoluble in aromatic hydrocarbon solvents' has reference to what are called pure solvents?

"THE WITNESS: Yes, sir.

"THE COURT: Now, by way of contrast to that, what you are telling me now with reference to the language of the patent to the effect that it is insoluble in what?

"THE WITNESS: Common paint vehicles.

"THE COURT: Common paint vehicles?

"THE WITNESS: An aromatic hydrocarbon solvent is not in and of itself used as a paint vehicle. It has no binding power. If it were so used the dry pigment would powder off at the surface upon evaporation of the solvent. Accordingly, the paint vehicle must have incorporated in it a resin or binding medium which will serve as a glue to hold the pigment to the surface when the solvent evaporates.

"THE COURT: A medium to hold what?

"THE WITNESS: The pigment to the surface to which applied after the solvent has evaporated.

"MR. SHERMAN: Q. And that is true, is it, even in a case where the pigment is itself a melamine sulfonamide formaldehyde resin?

"A. Yes.

"THE COURT: In other words, if I understand it, you are drawing a distinction between solubility in pure solvents on the one hand and solubility or insolubility in connection with common paint vehicles, which comprise not the pure solvents themselves, but pure solvents with some kind of binder added?

"THE WITNESS: Right, Your Honor.

"THE COURT: All right."

Thus, an important portion of the specification which Switzer relied upon for antecedent support to the claims (an essential to make out a case of validity in the first instance) has now been shown to contrast with and be distinct from the expression "substantially insoluble in aromatic hydrocarbons". With that portion of the written description eliminated from an understanding of what the claims mean, the claims themselves become meaningless. Switzer thus has proved that it led this Court into error in originally concluding that the claims were supported by and made definite by the general description and examples.

Switzer has now proved that there is no simple clear test to determine substantial insolubility

On the first appeal, this Court continued its discussion, page 166:

". . . . There is testimony to the effect that 'sufficient melamine to render the resin substantially insoluble' is a simple,

clear test for an ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case. Under such circumstances, the fact that some preliminary testing is required does not render the claim invalid for vagueness. *Mineral Separation, Limited v. Hyde*, 1916, 242 U.S. 261, 37 S.Ct. 82, 61 L.Ed. 286."

On this point also, Switzer, on the contempt hearings, destroyed the factual premises upon which this Court based its earlier decision.

This Court's reference to "testimony to the effect that 'sufficient melamine to render the resin substantially insoluble' is a simple, clear test for an ordinary chemist to perform and one which does not require extensive experimentation in order that the precise critical limits be ascertained in a particular case." is based upon the following testimony of Dr. Hatcher (OR 397):

"Q. (By Mr. Manahan): What, if anything, is critical about the solubility of a resin used as a pigment?

"A. It is necessary that it be sufficiently insoluble that it will not agglomerate in the vehicle that is used.

"Q. How difficult is the solubility test for a resin?

"A. It is not difficult. It is readily observable."

Counsel then identified the results of four solubility test experiments, to-wit Exhibits L, M, N, and O. With respect to the Japanese experiment, Dr. Hatcher testified (OR 399):

"Q. (By Mr. Manahan): Did you follow exactly the procedure set forth in the Japanese Patent?

"A. The procedure in the Japanese Patent was followed explicitly.

"Q. What was the solubility of the resulting resin?

"A. It was soluble in toluene."

With respect to the patented resin, Dr. Hatcher testified (OR 400):

"Q. Have you ever carried out the procedure of the Kazenas Patent, Example 5?

"A. Yes, I have.

"Q. Do you have an example of the resin obtained?

"A. Yes, I have. It is Exhibit N—N as in Nelly, your Honor.

"Q. What is the softening point of that resin?

"A. As I recall, it was 112 degrees Centigrade.

"Q. What was the solubility of this resin in toluene?

"A. It was insoluble in toluene.

"Q. How can you tell?

"A. By dispersing it in toluene and leaving it. It did not agglomerate. It remained free-flowing.

"Q. When was this resin prepared?

"A. It was prepared in late August, 1958.

"Q. Have you had that sample under your watch and care ever since?

"A. I have had it in my possession since that time.

"Q. Is the resin still insoluble?

"A. The resin still is insoluble. It is free-flowing."

With respect to the ease of the experiments, Dr. Hatcher testified (OR 405):

"Q. Now, Dr. Hatcher, how difficult is it for a chemist to repeat an amide condensation and obtain the same results time and again?

"A. Once the procedure has been standardized it can be done with ease.

"Q. Would the results be identical each time?

"A. Not entirely. They could vary in slight manner, but they would not be altered by any large amount."

Switzer called the attention of the foregoing testimony to this Court in support of the original appeal in its Brief for Defendant Appellee, pages 9-10:

"... Dr. Hatcher explained to the Trial Court that when he dispersed the Kazenas Example 5 resin in toluene: 'It did not agglomerate. It remained free-flowing' (R. 400).

"This initial toluene insolubility test for the Kazenas resin of Dx. N had been carried out some four months before the trial (R. 401), yet Dr. Hatcher was able to demonstrate these test results to the Court at the time of trial since the resin was still free-flowing in Dx. N (R. 401). . . ."

At page 22, Switzer again referred to this testimony:

"... the District Court had an opportunity to hear extensive testimony by Dr. Hatcher (R. 398-401) concerning the Japanese patent and experiments which he had made in connection therewith. . . ."

Again referring to this testimony on page 23, Switzer had this to say:

"The insolubility of the resin in aromatic hydrocarbons which may be used as paint vehicles is critical in this situation (R. 397). The resin must be so insoluble that its particles do not agglomerate—i.e. remain free-flowing—if they are to function satisfactorily as discrete pigment particles (R. 400)."

There is nothing ambiguous or indefinite in the standard thus laid out. Dr. von Fischer had no difficulty in understanding what Switzer and this Court as well had said. He was asked the following questions and gave the following answers (RT 256):

"Q. Now, I pose this hypothetical situation to you, Dr. von Fischer, and that is that instead of the words 'substantially insoluble' having anything to do with dictionary meanings that you are informed that the words 'substantially insoluble' in aromatic hydrocarbon solvents mean this: That the resin is capable of being finely ground, deposited in an aromatic hydrocarbon solvent, and that in order to meet that definition it must remain suspended without agglomeration or coalescence. Now, assume that that is the definition which is to be put on 'substantially insoluble', then how long would you have to permit the product to stand in a suspended condition before you would be satisfied that it was substantially insoluble?

"A. Well, as you state the supposition this would be infinite, an infinite period of time.

"Q. As I stated the supposition the way you understand what I said it would have to be forever?

"A. Forever."

After Switzer learned that the three components in the accused resin did not fulfill the tests upon which it once relied, it urged the District Court to ignore solubility tests where the resin agglomerates by reason of its "sensitivity". In doing so Switzer proved that a test of whether or not a resin remains free-flowing is meaningless and unimportant.

Significantly, Dr. Hatcher did not so testify. Switzer brought in Dr. von Fischer to make a new series of experiments. His main series consisted of quantitative solubility measurements of resins

in the three solvents in which the examination was made at the end of 24 hours (RT 212-213). He testified that 24 hours is certainly more than adequate (RT. 235). In all cases, he used a maximum of 24 hours and made no determination at all to determine whether it is a fact that equilibrium is reached in 24 hours (RT. 247).

At RT 255, he was asked the following questions on cross-examination and gave the following answers:

"Q. And let us say that the material agglomerates in 36 hours. Would you then say that the material is soluble or insoluble?

"A. I would say the agglomeration is not due to solubility, but sensitivity to the solvent.

"Q. Now, I pose this hypothetical question to use, that instead of the—

"THE COURT: Wait a minute. What did he say? If the agglomeration should occur after 24 hours you would say—?

"THE WITNESS: That it would not be an indication of solubility, but sensitivity of the resin to the solvent.

"MR. HOPPE: Q. And that is because in part you have concluded that equilibrium will be reached in 24 hours and whatever happens after 24 hours is due to something else?

"A. I had indicated that I believe that you would get what would be termed a saturated solution considerably before 24 hours and certainly a 24-hour period would be adequate."

Dr. von Fischer's positive distinction between solubility and sensitivity to the solvent is at direct variance with that which Switzer proved on the original trial. At that trial, Switzer found it necessary to read meaning into the words "completely condensed" by reproducing Example 5 of the Kazenas patent but using less formaldehyde than was called for in the patent example. At page 55 of its opening brief, Switzer told this Court on the first appeal:

"Actually, of course, the mere addition of melamine to a melamine-sulfonamide-formaldehyde resin that is soluble in toluene, does not in and of itself render the resulting resin *insoluble* in toluene. That was established by Joseph L. Switzer (R. 514-15) by adding enough melamine to the

Japanese resin to bring the total melamine content up to 13%. The resulting resin was 'still very sensitive to toluene' (R. 515)."

Thus, on the first appeal, sensitivity to toluene and solubility in toluene were treated as one and the same—to make out contempt a distinction had to be drawn.

Phrases which are susceptible to such opposite meanings, being synonymous at one time and distinct at another time, do not serve the purpose of particularly pointing out and distinctly claiming the invention. This is particularly true in this case. Here the meaning of the phrase in the claims must be inherent in the specification for otherwise, there would have been no warrant for adding the claims late in the prosecution of the patent application.

Switzer has now proved that aromatic solvents are indefinite

The record on the contempt hearings establishes still another area in which the claims are ambiguous and fail to particularly and distinctly claim the invention. At the time of the first appeal, it seemed perfectly clear to this Court, as is manifest from the first opinion, that there was nothing mysterious in the phrase "aromatic hydrocarbon solvents." This Court was able to treat the phrase generically and it did so many times in its original opinion. Typical expressions are:

"The Kazenas patent is for a resin . . . which remains insoluble without agglomeration in aromatic hydrocarbon solvents." (299 F.2d 162-163)

"The Japanese resin . . . is soluble in aromatic hydrocarbons, while the Kazenas resin is substantially insoluble." (299 F.2d 163)

". . . The feature to which this contention [late claiming] is specifically addressed is the resin's insolubility in aromatic solvents." (299 F.2d 166)

". . . What it [Radiant] requires is that which the Kazenas resin provides: completeness of co-condensation and insolubility in aromatic solvents." (299 F.2d 168)

Similarly, the District Court, in treating of aromatic hydrocarbon solvents, repeatedly used that phrase in a generic sense

(OR 125, 126, 130, 131, 132, 133, 135, 136, 137, 138) although it mentioned the three basic aromatics, benzene, toluene and xylene specifically in its discussion of the merits of the controversy (OR 130, 136).

Switzer has now contended, to the satisfaction of the District Court on the contempt proceedings, that benzene must be excluded from the generic phrase "aromatic hydrocarbon solvents." In support of this contention, its vice-president, Dr. von Fischer, testified (RT 220):

"Q. Now, do you have any authority in the literature for your statement that benzene is not used as is toluene and xylene as solvents in paint vehicles?

"A. Yes, I think in numerous publications the statement will appear that benzene, although an aromatic hydrocarbon solvent, is generally not used because, first of all, it is highly toxic; secondly, it is a very rapidly evaporating material which is often not desirable; thirdly, it's hazardous also from the standpoint that it has an extremely low flash point, is the term, one that is almost zero degrees Fahrenheit; and in addition the atmosphere in which the benzene vapor might appear easily becomes an explosive mixture. It has a very low percentage content giving an explosive mixture. As I recall it's on the order of one point four percent. Benzene vapor in an atmosphere can make the entire atmosphere an explosive mixture. Therefore, it is not really a practical solvent."

In support of this testimony, Switzer offered its Exhibits S-40 and S-41.

On cross-examination on this subject matter, Dr. von Fischer testified in part as follows (RT 287):

"Q. Now, I would like to turn to aromatic hydrocarbon solvents. In 1954 what were the aromatic hydrocarbon solvents generally, Dr. von Fischer? They were Benzene, toluene and Xylene, weren't they?

"A. Sir, I am afraid I couldn't enumerate the long list of different types of aromatic hydrocarbon solvents that were available in 1954.

"Q. Well —

"A. As they were innumerable.

"Q. Well, in any event, Benzene, toluene and Xylene are three aromatic hydrocarbon solvents, aren't they?

"A. They are three basic aromatic hydrocarbons.

"Q. Now, in addition to those three what other aromatic hydrocarbon solvents were there in 1954—and before you answer, I understand that there were many. Just give us five or six typical ones.

"A. The ones that I have reference to are mixtures of hydrocarbons generally classified under trade numbers, products of the Switzers as well as other people in the field, commonly used for aromatic hydrocarbon solvents. Referring to the Solvents and Chemical Groups designations, they have numbers like SC-2, SC-2A, SC-3, SC-100, SC-150.

"Q. Now, of the three aromatic hydrocarbon solvents that are known as Benzene, toluene and Xylene, have you any opinion as to which of those three is produced in the greatest quantity in this country?

"A. I am sorry, you say "produced" and not "used as solvents."

"Q. I am sorry. My question is, which are produced in this country?

"A. I don't have figures at hand, but I think it would be Benzene.

"Q. Now, is Benzene ever used as an aromatic hydrocarbon solvent?

"A. Yes. Yes, it is at times.

"Q. And in the Technology of Solvents and Plastics, I would like to read this into the record.

"THE COURT: What are you reading from?

"MR. HOPPE: From Exhibit S-40, Your Honor.

'Benzene (Benzol), the simplest aromatic hydrocarbon, is a colorless liquid of characteristic, aromatic odor. It dissolves fats, waxes, gums, rubbers and cellulose ethers. Although sometimes employed as a component of stains, paint removers, cements, cleaners and lacquers, such solvent applications of Benzene are limited by its high volatility and toxicity.'

"MR. HOPPE: Q. Now, outside of the fact that that text says that the use of Benzene in lacquers is limited, is it not true that Benzene is extensively used, even though limited, as a solvent?

"A. Not in the paint industry.

"Q. Is it measurably used as a solvent in the paint industry?

"A. I have no figures. I am sure there is a small quantity used in specialty finishes.

"Q. Where resins are also used?

"A. Where vehicle or binder resins are used.

"Q. So in specialty finishes you would concede that aromatic hydrocarbon solvents would include Benzene as one of the members of the aromatic hydrocarbon solvent family?

"A. Benzene is a member of the aromatic hydrocarbon series and, I have said, is used to a limited extent in paint formulations—specialty type formulations.

"Q. Now, one of the reasons that you assign for not using Benzene yourself is that it is toxic, is that correct?

"A. That is correct.

"Q. And what does 'toxic' mean? That it's a poison?

"A. It is poisonous and has a very—a very small percentage of the Benzene vapor in the atmosphere has a drastic effect on the human system.

"Q. At this point I would like to read into the evidence from Defendant's Exhibit S-16, which is the toluene example, the following warning.

"THE COURT: Wait a minute. This is S-16, now?

"MR. HOPPE: S-16, a bottle of toluene.

"THE COURT: Just a bottle of toluene?

"MR. HOPPE: Just a bottle of toluene.

"THE COURT: All right.

"MR. HOPPE: 'Warning: Flammable. Vapor harmful. Keep away from heat, sparks and open flame. Keep container closed. Use only with adequate ventilation. Avoid prolonged breathing of vapor. Avoid prolonged or repeated contact with skin. Do not take internally. Poison.'

"And I point out for the record that 'poison' on each side is delineated by two skulls and crossbones, and that the entire word 'poison' and the two skulls and crossbones are red.

"MR. HOPPE: Q. And I will ask you if it is not true that toluene is also toxic?

"A. Yes, it is, but the tolerance limits are higher for toluene than they are for Benzene."

In thus construing the generic phrase "aromatic hydrocarbon solvents" as excluding benzene, Switzer has confessed, indeed it has proclaimed, that the claim language is broader than the invention in this critical area of novelty. In so doing, Switzer has also confessed that the claims are invalid for failure to comply with U. S. Code, Title 35, Section 112. *Graver Mfg. Co. v. Linde Co.* (1949), 336 U. S. 271 held that certain process claims calling for the use of "silicates" and "metallic silicates" did not comply with the statute because these claims were too broad and comprehended more than the invention. The court held that claims fail "to perform their function as a measure of the grant when they overclaim the invention." (336 U. S. 277). It cannot be gainsaid that the claim to "aromatic hydrocarbons" by definition includes benzene. Under the rule of *Graver*, Radiant submits that these claims are void and that in the interest of justice, this Court should so declare them at this time.

The intervening case law confirms invalidity of the claims

This Court, in its earlier decision, adopted Switzer's contentions that the law did not require it "to state the critical lower limits precisely" and that the law permitted "some preliminary testing" in order "that the precise critical limits be ascertained in a particular case." Most respectfully, Radiant submits that the sounder cases which have emerged since the earlier appeal show that these contentions of Switzer were, and they are, in error.

Judge Browning, speaking for a panel consisting of Circuit Judges Jertberg and Browning and District Judge Jamieson, in *Nelson v. Batson* (9 Cir. 1963), 322 F.2d 132, stated that "Precise claims are required" for reasons fully developed at 322 F.2d 134. Thus, this Court has now concluded that "the alternative" to which Switzer objected on the first appeal is *not* an alternative at all but, that to the contrary, it is a mandatory requirement of the patent law. Validity of the claims was not before the Court in *Nelson*, however, because the parties had entered into a consent decree that the claims were valid. This Court, therefore, precisely construed the claims to conclude that

a structure differing from the disclosure of the patent did not infringe that patent.

Senior Circuit Judge Hamlin sat by designation in, and thus gave a Ninth Circuit flavor to, *H. C. Baxter & Bro. v. Great Atlantic & Pacific Tea Company* (1 Cir. 1965), 352 F.2d 87 affirming (D.Me. S.D. 1964), 236 F. Supp. 601, cert. den. (1966), U.S. There, the court in a *per curiam* decision held that claims for a process patent of pretreating French fried potatoes so that they will fry to "a substantially even color" were invalid "because of the extent of experimentation required by one skilled in the art in order to ascertain their 'teaching'." The District Court decision thus affirmed shows, as analogous to the contention actually admitted by Switzer here, 236 F. Supp. 611:

"... a person attempting to use the process could only ascertain the limitation by experimentation . . ."

The discussion of the statute and the case law, 236 F. Supp. 612, is at direct variance with the excuses which Switzer urged on the first appeal.

District Judge Hall, in *McCulloch Motors Corporation v. Oregon Saw Chain Corp.* (S.D. Cal. C.D. 1964), 234 F. Supp. 256, treated the statutory requirement as being of such importance that he declared invalid on its face on a motion for summary judgment mechanical patent claims using the indeterminate adjectives "long" and "short" to describe links in chain saws for sawing wood. He held that "evidence as to what someone skilled in the art would do with the patent" was inadmissible on this question of law (234 F. Supp. 259). Judge Hall relied on many of the same authorities upon which Radiant relied on the first appeal and which Switzer did not even attempt to distinguish (234 F. Supp. 259).

In *Johnson & Johnson v. Kendall Company* (7 Cir. 1964), 327 F.2d 391, the court categorically observed, after holding the patent invalid on other grounds, p. 396, that "It is well established that claim elements may not be functional at the point of alleged novelty." Yet, that is the admitted situation in the claims at bar.

That same court, in *A R Inc. v. Electro-Voice, Incorporated* (7 Cir. 1962), 311 F.2d 508, held a claim for a loudspeaker enclosure to be void where it differed from the prior art "by reason of the element or functional relationship set forth . . . in the closing clause" of the claim (311 F.2d 510). This functional relationship was related to the term "optimum resonant frequency" as used in the specification. As to this, the court held, page 512:

" . . . Moreover, Villchur, in his deposition admits that the term 'optimum resonant frequency' which appears in the specifications expresses a definite value only in the sense of referring to the measure of distortion acceptable in connection with the use or purpose for which the speaker system is designed and intended or 'what power capabilities you want to achieve'. Such criteria does not meet the definiteness required of a valid claim. *General Electric Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 58 S.Ct. 899, 82 L.Ed. 1402."

Here, too, Dr. von Fischer and Mr. Gray have both made it quite emphatic that "substantially insoluble" expresses nothing other than that measure of insolubility acceptable in connection with the use or purpose for which the resin is to be used. As said in *AR Inc.*, "Such criteria does not meet the definiteness required of a valid claim."

Also pertinent is the decision of District Judge Watkins in *Marshall v. Proctor & Gamble Manufacturing Company* (D. Md. 1962), 210 F. Supp. 619. He there condemned claims using subjective, indeterminate, ambiguous and indefinite expressions to define novelty in the claims. At page 628, he said:

"The court recognizes that except where criticality is the essence of an invention, latitude in the expression of standards is permissible; but there should be some ascertainable standard. Here, instead of the vague 'good', 'substantially', 'freedom from objectionable', 'high', 'excellent'—the meaning of which is completely dependent upon how 'high' or 'low' the reader, or manufacturer, or consumer 'sets his sights', it would have been easy to state a basis upon which true comparisons could have been made. . . ."

At page 629 he said:

"Plaintiff, or his patent attorney, knew how to express 'evidences', or attributes, specifically. The failure to do so in the patent as issued seems deliberate. It appears to have been designed to permit plaintiff to apply his own definitions to these 'evidences,' and as so defined, elastically if necessary, to claim infringement."

How pertinent that thought is to the new experiments Switzer has here adduced to define what "substantially insoluble" and what "aromatic hydrocarbon solvents" now mean! At page 631, Judge Watkins said:

"The claims should point out the limits of the coverage of the patent. Where they do not, they fail in their purpose of describing the boundaries of the invention, within which no one may properly operate unless licensed under the patent; outside of which, the field is open to the public. Where such 'no trespassing' signs are not properly posted defining the protected boundaries, the claims are invalid."

In summary, since this Court's decision on the first appeal, this Court, and other courts as well, have recognized the inherent soundness of the rules and authorities which Radiant asked this Court to apply on the first appeal⁸ and the lack of merit in contentions such as those which Switzer advanced to avoid the clear mandate of U. S. Code, Title 35, Section 112. It is now established, Radiant submits, that the true rules to be applied are that claims

8. *United Carbon Co. v. Binney Co.* (1942), 317 U.S. 228 is cited with favor or followed in *Nelson* (322 F.2d at 134), *McCulloch Motors* (234 F. Supp. at 259), and *Marshall* (210 F. Supp. at 630); *Standard Brands v. Yeast Corp.* (1939), 308 U.S. 34 is followed in *Baxter* (236 F. Supp. at 612) and *Marshall* (210 F. Supp. at 631); *Gen. Electric Co. v. Wabash Co.* (1938), 304 U.S. 364 is cited with favor or followed in *Nelson* (322 F.2d at 135 and 138), *Baxter* (236 F. Supp. at 612), *McCulloch Motors* (234 F. Supp. at 259), *Johnson & Johnson* (327 F.2d at 396), *A R Inc.* (311 F.2d at 511), and *Marshall* (210 F. Supp. at 630); *Barkeij v. Lockheed Aircraft Corp.* (9 Cir. 1954), 210 F.2d 1 is followed in *McCulloch Motors* (234 F. Supp. at 259) and *Marshall* (210 F. Supp. at 631); *Vitamin Technologists v. Wisconsin Alumni Research F.* (9 Cir. 1944, as amended 1945), 146 F.2d 941 is followed in *Marshall* (210 F. Supp. at 631); and *Farmers' Cooperative Exchange v. Turnbow* (9 Cir. 1940), 111 F.2d 728 is followed in *McCulloch Motors* (234 F. Supp. at 259).

must be precise at the point of novelty, that they may not define novelty in subjective and indeterminate words and that they cannot require any member of the public to experiment to discover the boundaries of the claims. Radiant submits, on the authority of *Helms Bakeries v. C.I.R.* (9 Cir. 1959), 263 F.2d 642, 644, cert. den. (1959), 360 U. S. 903, reh. den. (1959), 361 U. S. 857, discussed at page 43 above, that these intervening authorities warrant a reconsideration of this Court's earlier decision.

CONCLUSION

In conclusion, Radiant submits that the judgment of the District Court should be reversed upon both of the questions presented for review.

On the first question, Radiant submits that the record is clear that if the standards are applied which resulted in the original judgment of validity in this case, Switzer has not proven by any simple clear test that the accused pigment includes an amount of melamine sufficient to produce substantial insolubility in aromatic hydrocarbon solvents but that to the contrary, Radiant has proved the affirmative that the amount of melamine is insufficient.

On the second question, Radiant submits that the new circumstances which Switzer has introduced into the case conclusively establish that the claims do not meet the standards of U. S. Code, Title 35, Section 112, as interpreted by the current authorities. In the exercise of its discretion, this Court is respectfully urged to reconsider its earlier decision on this point and to direct the District Court to enter judgment holding the Kazenas patent invalid.

Respectfully submitted,

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Dated at San Francisco, California

July 22, 1966

CERTIFICATE OF COUNSEL

I certify that, in connection with the preparation of this brief, I have examined Rules 18 and 19 of the United States Court of Appeals for the Ninth Circuit, and that, in my opinion, the foregoing brief is in full compliance with those rules.

CARL HOPPE,

Attorney for Appellants.

Appendix

LIST OF PLAINTIFFS' EXHIBITS

	Description	Identified	Offered	Received
R-C	Deposition of James T. Wayne	7	428	430
R-D	Deposition of Daniel Bennahmias	8	429	430
R-1	Formula Sheet No. 5782 used in making typical 4-C pigment	331	369, 428	370, 430
R-2	Formula Sheet No. 8347 used in making Wayne test resin	333	369, 428	370, 430
R-3	Jar containing toluene-sulfonamide used in making Wayne test resin	371	371, 428	371, 430
R-4	Jar containing paraformaldehyde used in making Wayne test resin	370	370, 428	370, 430
R-5	Jar containing melamine used in making Wayne test resin	371	371, 428	371, 430
R-6	Jar containing unground Wayne test resin....	371	371, 429	430
R-7	Jar containing powdered Wayne test resin....	372	429	430
R-8	Jar containing Wayne test resin in benzene..	378	429	430
R-9	Jar containing Wayne test resin in toluene....	384	429	430
R-10	Jar containing Wayne test resin in xylene....	388	429	430
R-15	Test tube containing unground Bennahmias test resin	411	429, 508	430, 508
R-16	Test tube containing powdered Bennahmias test resin	413	429, 508	430, 508
R-17	Test tube containing Bennahmias test resin in benzene	415	429, 508	430, 508
R-18	Test tube containing Bennahmias test resin in toluene	417	429, 508	430, 508
R-19	Test tube containing Bennahmias test resin in xylene	419	429, 508	430, 508
R-25	Time-Temperature Graph showing reaction of Wayne test resin	367	370, 429	370, 430
R-28	Jar containing Kazenas Example 2 resin in acrylic vehicle	142	—	—
R-29	Jar containing Kazenas Example 4 resin in acrylic vehicle	143	—	—
R-30	Defendant's Exhibit L, a resin of Example 5 of Kazenas patent but with 5% melamine instead of 13%	150	639A	639A

	Description	Identified	Offered	Received
R-31	Defendant's Exhibit M, a jar containing Japanese resin but made with more formaldehyde	152	640	640
R-32	Defendant's Exhibit N, a jar containing Example 5 of the Kazenas patent	153	640	640
R-33	Defendant's Exhibit O, a jar containing example of prior art Japanese resin	154	640	640
R-34	Defendant's Exhibit P, a jar containing Example 5 of the Kazenas patent	175	640	640
R-37	Time-Temperature Graph showing reaction of typical 4-C pigment	344	366	370
R-38	Test tube containing 4-C pigment in benzene, prepared July 2, 1963	374	376	376
R-39	Test tube containing 4-C pigment in toluene prepared around July 2, 1963	376	378	378
R-40	Jar containing resin prepared following Example 5 of Kazenas patent but using formaldehyde and sulfonamide in equa-molar proportions	392	509	509
R-41	Jar containing R-40 resin in toluene prepared as courtroom demonstration	397	509	509
R-42	Jar containing R-40 resin in toluene prepared 10/8/65	401	509	509
R-43	Test tube containing a 7-4-1 resin (designated JS 738) in benzene, prepared 7/13/63	404	509	509
R-44	Test tube containing a 7-4-1 resin (designated JS 738) in toluene, prepared 6/28/63	407	509	509
R-45	Formula Sheet No. 5781 covering an abortive batch of pigment	507	640	641
R-46	Test tube containing 7-4-1-0.5 resin (designated JS 739) in benzene, prepared 7/13/63	511	640	641
R-47	Test tube containing a 7-4-1-0.5 resin (designated JS 739) in toluene, prepared 6/29/63	512	640	641
R-48	Tabulation of quantitative solubilities of resins	531	535	535
R-49	Chart of solubility versus time for Japanese resin stirred in toluene at room temperature	536	641	641
R-50	Chart of solubility versus time for Japanese resin stirred in xylene at room temperature.. ..	537	641	641
R-51	Chart of solubility versus time for R-40 resin stirred in toluene at room temperature	542	543	543

	Description	Identified	Offered	Received
R-52	Chart of solubility versus time for R-40 resin stirred in xylene at room temperature	542	543	543
R-53	Chart of solubility versus time for R-40 resin standing in toluene	545	548	548
R-54	Chart of solubility versus time for Wayne resin stirred in benzene at room temperature	550	641	642
R-55	Chart of solubility versus time for Wayne resin stirred in toluene at room temperature..	551	641	642
R-56	Chart of solubility versus time for Wayne resin standing in benzene at room temperature	553	641	642
R-57	Graph of reaction temperature for Wayne resin	598	642	642
R-58	Chart of reaction for Gray resin S-5	600	642	642
R-59	Chart of Kazenas claim 2 and comparison with Japanese resin	639	—	—

LIST OF DEFENDANT'S EXHIBITS

	Description	Identified	Offered	Received
S-1	Jar containing sulfonamide used in making Gray test resin	119	120	120
S-2	Jar containing formaldehyde used in making Gray test resin	120	120	121
S-3	Jar containing melamine used in making Gray test resin	121	121	121
S-4	Jar containing unground Gray test resin.....	121	121	121
S-5	Jar containing powdered Gray test resin.....	121	121	122
S-6	Test tube containing Gray test resin in benzene	194	196	197
S-7	Test tube containing Gray test resin in toluene	198	199	200
S-8	Test tube containing Gray test resin in xylene	200	200	200A
S-9	Log sheet made during reaction of Gray test resin	123	124	124
S-10	Notice of taking deposition, 9/25/65.....	125	125	125
S-11	Deposition of Mr. Gray and Dr. von Fischer..	125	125	126
S-12	Bulletin by Radiant	59	59	60
S-13	Bulletin by Radiant on Velva-Glo	62	63	64
S-14	Copy of patent in suit.....	73	73	74
S-15	Jar containing Japanese resin made in March-April, 1958	77	78	78
S-16	Bottle of toluene	79	117	117
S-17	Jar containing Japanese resin in toluene	82	117	117
S-18	Test tube containing resin of Example 3 of Kazenas patent in toluene	87	117	118
S-19	Test tube containing resin of Example 1 of Kazenas patent in toluene	90	118	118
S-20	Test tube containing resin of Example 6 of Kazenas patent in toluene	93	118	118
S-21	Test tube containing Japanese resin in toluene	94	118	119
S-22	Jar containing Example 1 resin in alkyd vehicle	104	112	113
S-23	Jar containing Example 1 resin in acrylic vehicle	104	112	113
S-24	Jar containing Example 3 resin in alkyd vehicle	107	112	113

	Description	Identified	Offered	Received
S-25	Jar containing Example 3 resin in acrylic vehicle	109	112	113
S-26	Jar containing Example 6 resin in alkyd vehicle	110	112	113
S-27	Jar containing Example 6 resin in acrylic vehicle	111	112	113
S-28	Jar containing Example 5 resin in alkyd vehicle	115	116	116
S-29	Jar containing Example 5 resin in acrylic vehicle	115	116	116
S-30	Batch chart No. 4683 of Radiant	187	190	190
S-31	Batch chart No. 4684 of Radiant	189	190	190
S-32	Batch chart No. 4833 of Radiant	190	190	190
S-33	Jar containing powdered Wayne resin R-7....	202	204	204
S-34	Jar containing Wayne resin R-7 in benzene, prepared 9/20/65	202	203	203
S-35	Jar containing Wayne resin R-7 in toluene, prepared 9/7/65	204	205	205
S-36	Jar containing Bennahmias resin R-16	206	207	207
S-37	Jar containing a 7-4-1 resin made by Bennahmias with 0.5 mole of urea	207	207	207
S-38	Kross affidavit	207	208	—
S-39	Table of quantitative solubilities of resins....	213	301	302
S-40	Technical literature on benzene	221	223	223
S-41	Technical literature on organic solvents	223	224	226
S-42	Copies of pages from dictionary including definition of "insoluble"	228	230	231
S-43	Military specification	305	—	—
S-44	Deposition of Daniel Bennahmias	325	—	—
S-45	Log sheet made during reaction of Bennahmias resin R-16	453	457	457
S-46	Test tube containing S-37 resin in benzene....	471	480	480
S-47	Log sheet made during reaction of Bennahmias resin R-16	613	613	613
S-48	Deposition of Dr. Huber	622	623	623

